TECHNOLOGY DEPT.

A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

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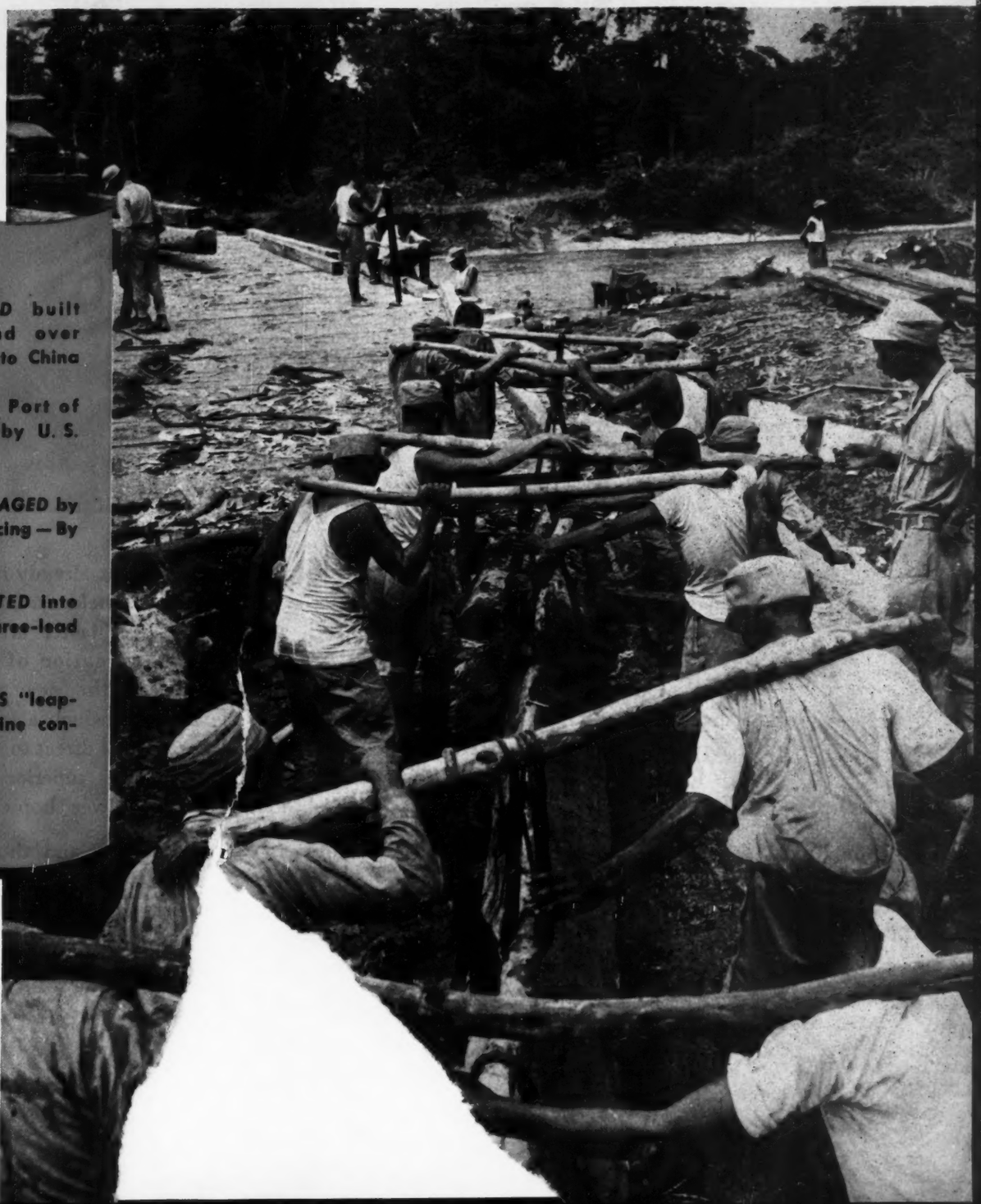

BURMA-LEDO ROAD built through jungle and over Himalayan "Hump" into China

•

ENEMY DAMAGE at Port of Cherbourg repaired by U. S. Army Engineers

•

OLD PAVEMENTS SALVAGED by widening and resurfacing — By A. H. HINKLE

•

CONCRETE PILES JETTED into place for Navy pier by three-lead driver

•

FILTER TROUGH FORMS "leap-frogged" for straight-line concrete placing

CHINESE ENGINEER TROOPS *carry heavy timber for building bridge across Mogaung River on Ledo Road in Burma.*

Many test casts are made in Inland's search for new and better steels.

Invest in Victory—Buy More War Bonds and keep them.

Steel samples from pilot casts undergo photo-micrographic analysis.

New Inland Steels for Tomorrow

Inland makes steel in heats of a few pounds each for experimental purposes, and in production heats of 100 to 150 tons. The small experimental heats are run in two induction type furnaces, located in an especially equipped department of the main laboratory. These pilot heats are the forerunners of the steels for tomorrow.

Making small casts of steel is one phase of Inland's continuous research for better methods of producing steel, and for better steels *that* will make better products.

It is Inland research that already has produced low-alloy, high-yield strength Hi-Steel, and lead-bearing, faster machining Ledloy. The newest creation of Inland research is Ti-Namel—the new vitreous enameling alloy steel to which a white enamel cover coat is applied direct to the base metal. Ti-Namel assures superior quality finish, longer life, and lower shop costs.

These new Inland steels, and those that are yet to come, will be important to manufacturers competing in peace-time markets.

Bars • Plates • Floor Plate • Structurals • Piling • Rails • Tr... ...ng Bars • Sheets • Strip • Tin Plate

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CURRENT JOBS

. . . and Who's Doing Them

BUILDINGS

Public—Navy contract for ordnance plant at Inyokern, Calif., was awarded to **Haddock Engineers, Ltd.**, of San Francisco, for an estimated $50,000,000. **Mason & Hanger Co.**, of New York, N. Y., has $10,000,000 Army contract for ordnance buildings at Radford, Va. Contract for converting aircraft plant into tire manufacturing plant at Pottstown, Pa., was awarded to **Day & Zimmerman, Inc.**, of Philadelphia, for $7,000,000. Tire plant at Houston, Tex., will be built by **Brown & Root, Inc.**, of Houston, for $6,150,000. Navy contract for $4,038,000 building at Houston, Tex., was awarded to **James Stewart & Co., Inc.**, of Dallas. Buildings at Dearborn, Mich., will be built by **F. H. McGraw & Co.**, of Hartford, Conn., for $3,000,947. **H. K. Ferguson Co.**, of Cleveland, Ohio, has $3,000,000 Army contract for ordnance plant at La Porte, Ind. Tire factory at Ottawa, Ill., will be built by **Darin & Armstrong**, of Detroit, Mich., for $2,500,000. Contract for Woodridge, N. J., plant went to **Mahony-Troast Construction Co.**, of Passaic, for $2,500,000. Hospital buildings at Murfreesboro, Tenn., will be built by **Foster & Creighton Co.**, of Nashville, for $1,779,887. **Fruco Construction Co.**, of St. Louis, Mo., has $1,285,000 Army ordnance plant contract. **Rust Engineering Co.**, of Pittsburgh, Pa., will build $1,000,000 chemical plant at Paducah, Ky. Tire factory addition at Gadsden, Ala., will be constructed by **A. K. Adams Co.**, of Atlanta, Ga., for $1,000,000. **Wigton Abbott Corp.**, of Plainfield, N. J., has $1,000,000 Army contract for Dover, N. J., arsenal.

Industrial—Factory at Dallas, Tex., will be built by **Inge Construction Co.**, of Dallas, for $2,000,000. Paper mill will be converted into sulphate pulp mill at Espanola, Ont., by **P. D. Dalton Co., Ltd.**, of Ontario, for $5,000,000. Plant at Worcester, Mass., will be built by **J. R. Worcester & Co.**, of Boston, for $3,000,000. **O. W. Burke Co.**, of Detroit, Mich., has $3,000,000 contract for tire plant. Car repair shops at Brainerd, Minn., will be built by **Al Johnson Construction Co.**, of Minneapolis, for $1,500,000. **Northern Construction Co.**, and **J. W. Stewart, Ltd.**, of Vancouver, B. C., will build $1,000,000 plant on Powell River.

HEAVY CONSTRUCTION

Tunnel and river-channel improvements at Boulder Dam in Nevada will be constructed by **Guy F. Atkinson Co.**, of Long Beach, Calif., for $2,586,450. **M. V. Killian & Co.**, and **E. B. Darby Co.**, of San Antonio, Tex., have $2,029,221 contract for aprons, taxiways and runways at Randolph Field. Runways at Whiting Field, Fla, will be built by **Smith Engineering & Construction Co.**, of West Pensacola, on $966,205 Navy contract. Filtration plant contract in Chicago, Ill., was awarded to **Pitt Construction Co., Inc.**, of Pittsburgh, Pa., for $942,738. Sprinkler system will be installed in Columbus, Ohio, depot by **Globe Automatic Sprinkler Co.**, of Cleveland, for $908,904. **Royce Kershaw & Co.**, of Montgomery, Ala., has been awarded contract for relaying, retimbering 80 mi. of main line railway in Alabama for $800,000.

HIGHWAYS

Among recent highway contract awards are the following: Pennsylvania: $573,000 to **C. P. Goeringer Construction Co.**, of Wilkes-Barre. Texas: $288,964 to **H. L. Campbell**, of Fort Worth; $214,288 to **Gaylord Construction Co.**, of Houston; $216,764 to **H. Page**, of Austin; and $207,503 to **Thomas & Ratliff**, of Rogers. Virginia: $519,517 to **Lane Construction Corp.**, of Meriden, Conn.; and $592,280 to **W. M. Jackson**, of Roanoke, and **W. E. Graham**, of Cleveland. Washington: $253,581 to **D. F. Whittaker**, of Seattle.

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

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THE *How* OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

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How **BURMA-LEDO ROAD** was built through jungle and over Himalayan "hump" to carry war supplies into China —p. 58

How **ELEPHANTS** were used for transportation in construction of Ledo Road —p. 59

How **PRIMITIVE PILEDRIVER**, manually operated, was used by Chinese in repairing bridge —p. 60

How **AIRBORNE EQUIPMENT** was disassembled in rear areas and flown to advance fields to be reassembled for work on Burma Road —p. 64

How **CHERBOURG HARBOR** was restored by Allied Engineers with equipment brought from England or left by Germans —p. 66

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How **NAVY DEPOT JOB** required fast moving of 3,500,000 cu. yd. of earth —p. 79

How **PARTS DEPARTMENT** of contractor's organization improvised materials and methods for equipment repair —p. 81

How **OLD PAVEMENTS** were modernized by careful rebuilding for improved service at moderate cost —p. 82

How **ARMY CRANE IN FRANCE** was loaded and moved by tank recovery unit —p. 92

McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK (18), N. Y.

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Editorial and Publishing Offices: 330 West 42nd St., New York (18); 520 North Michigan Ave., Chicago (1); 68 Post St., San Francisco (4); 738-9 Oliver Bldg., Pittsburgh; Aldwych House, London, W. C. 2, England. Branch Offices: Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Los Angeles; Atlanta, Ga.

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CONSTRUCTION METHODS, April 1945. Volume 27, Number 4. Published Monthly, price 50¢ a copy. **Return Postage Guaranteed.** Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, 330 West 42nd Street, New York (18), N. Y. **Subscription rates**—United States, Mexico and Central and South American countries, $1.00 a year, $1.50 for two years, $2.00 for three years. Canada, $1.50 a year, $2.50 for two years, $3.00 for three years. Great Britain and British Possessions, 12 shillings a year, 36 shillings for three years. All other countries, $2.00 a year, $6.00 for three years. Please indicate position and company connection on all subscription orders. Entered (or reentered) as second class matter December 16, 1936, at the Post Office of New York, N. Y., U. S. A., under the Act of March 3rd, 1879. Printed in U. S. A. Cable address: "McGrawhill, New York." Member of A. B. P. Member of A. B. C. Contents copyrighted 1945 by McGraw-Hill Publishing Co., Inc., 330

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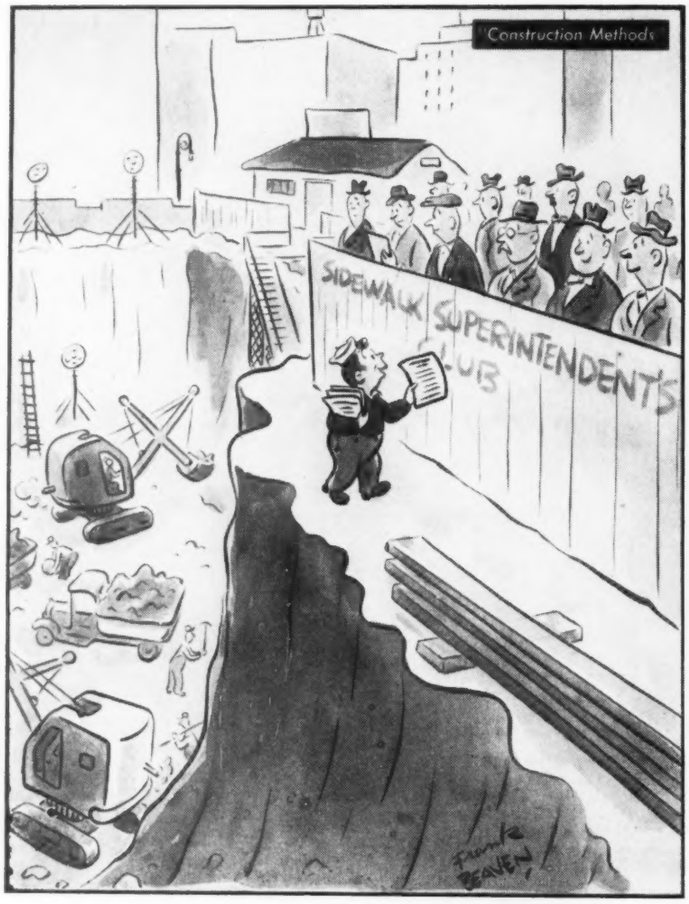


"Get your programs here, folks. Programs!"

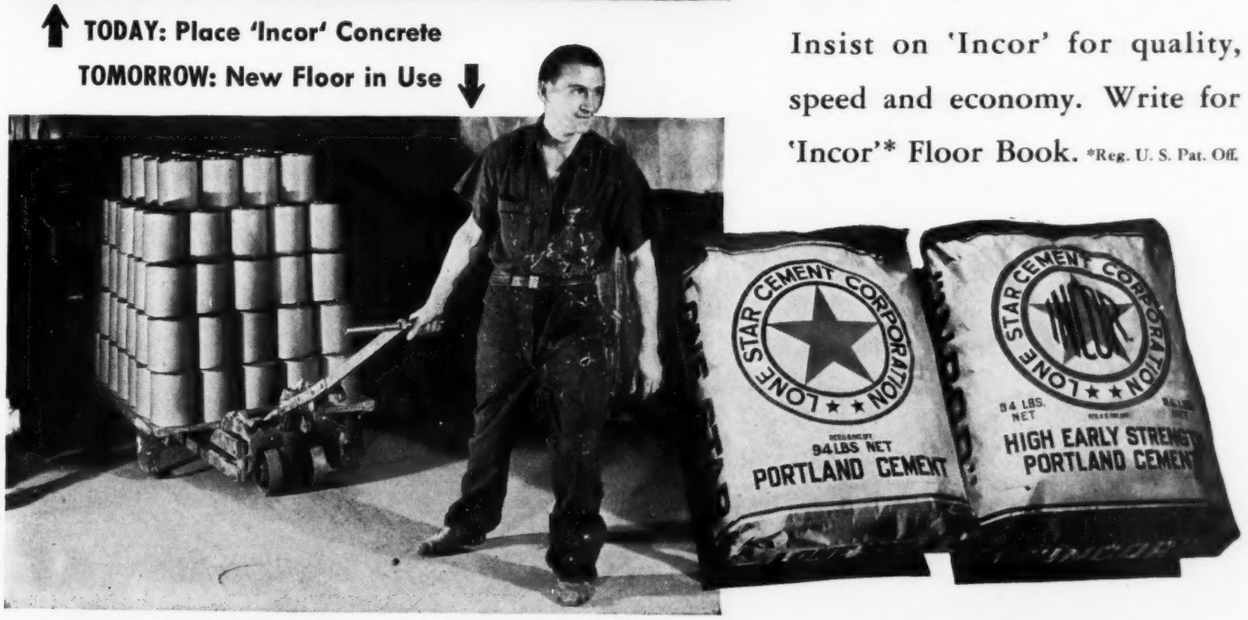
"He used to be an aerial artist in a circus."

NO PLANT SHUT-DOWN!

DURABLE, NON-DUSTING, HEAVY-DUTY FLOORS OVERNIGHT

TODAY: Place 'Incor' Concrete

TOMORROW: New Floor in Use



WORN-OUT floors in industrial plants slow down operations, boost labor costs. Rebuild them with 'Incor' 24-Hour Cement. Place 'Incor' concrete today . . . new floor in use tomorrow. 'Incor' cures thoroughly in 24 hours . . . saves 5 to 7 days.

NO PLANT TIE-UP

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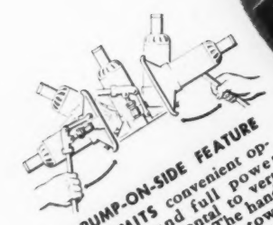
LARGE SLED-TYPE BASE GIVES JACK solid and firm footing. Minimizes damaging, dangerous and temper-ruining tipping. Slide your Blackhawk into place quickly, easily—and positively.

CENTER LOAD

BlackhawkJacks are designed to eliminate off-center strain and tipping—*look at the position of the saddle*—it's dead-center on the base—thus distributing the load evenly and safely—what's more, the serrated saddle has no overhang to shear off. The load is *always* directly in line with the piston!



PUMP-ON-SIDE FEATURE PERMITS convenient operation and full power from horizontal to vertical positions. The handle *always* extends toward the operator, not toward the floor giving you *extra* utility for shop jobs.

TAKE A *Load's-Eye* VIEW OF A BLACKHAWK JACK!

LOOK at this *business* end of a Blackhawk Jack—trim as a *battle-wagon* readied for the *the* fight—stripped of all breakable non-essentials—designed to assure automatic *centering* of the load! Just as good as it looks—*and tough!* That's why Blackhawk Hydraulic Jacks are the choice of construction. *Only* Blackhawks carry the "Service-Proved" Seal that is your guarantee of safety—dependability—utility—satisfaction! Capacities up to 50 tons.

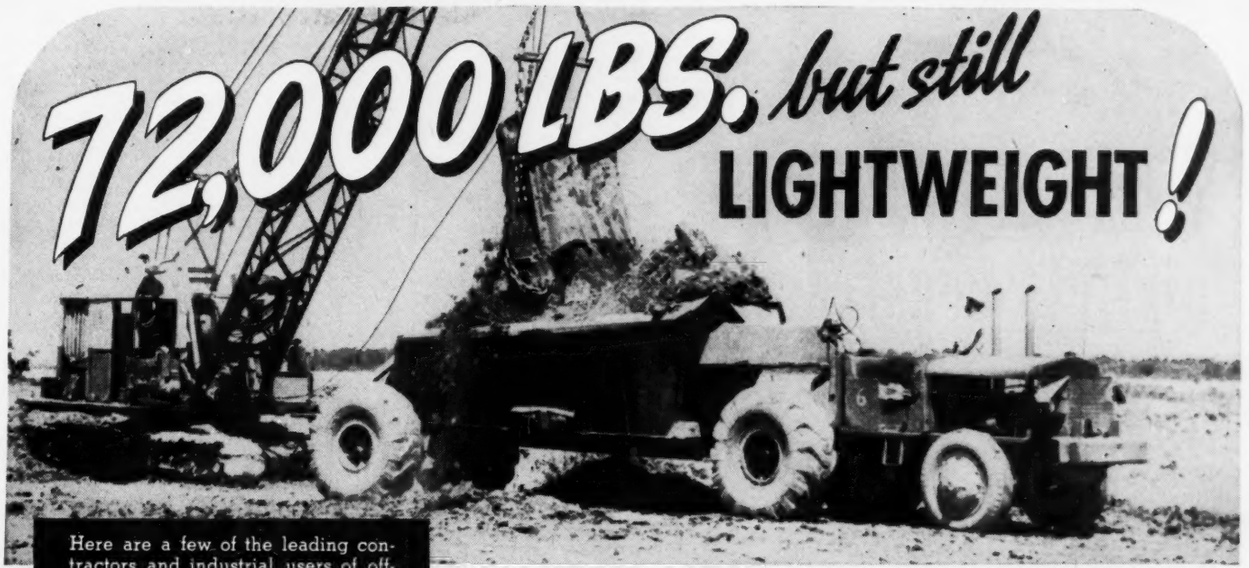
When you buy a jack—buy the best—buy a Blackhawk from your Industrial Supply House.

A Product of BLACKHAWK MFG. COMPANY, Dept. J2345, Milwaukee 1, Wisconsin

DEPENDABILITY SEAL OF *Service Proved* QUALITY PERFORMANCE

ARMY E NAVY

BLACKHAWK



Here are a few of the leading contractors and industrial users of off-the-highway hauling equipment that are new owners of Euclids:

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B & M Construction Co., Pittston, Pa.
Blair Quarries Blair, S. C.
John Booth, Inc. Carbondale, Pa.
A. B. Burton Co. Lynchburg, Va.
W. L. Cobb Construction Co. Decatur, Ga.
Donegan Coal Co., Fenwick, W. Va.
H. C. Frick Coke Co., Pittsburgh, Pa.
W. E. Graham & Sons, Roanoke, Va.
Samuel Krauss Co. St. Louis, Mo.
Limestone Products Uhthoff, Ont.
McFeeley Brick Co. Latrobe, Pa.
H. E. Millard Annville, Pa.
Morgan Coal Co. Bryant, Ill.
Peacock & McQuigge, Ltd. Toronto, Ont.
Pickands-Mather & Co. Duluth, Minn.
Richmond Coal Co. Marfrance, W. Va.
Standard Lime & Stone Co. Baltimore, Md.
Walsh Construction Co. New York
Walters & Prater, Morristown, Tenn.

A hauling unit with a gross weight of 36 tons is big equipment in any man's language, but the Bottom-Dump EUCLID is "lightweight" by virtue of its large payload capacity. Bottom-Dump EUCLIDS weigh approximately 32,000 lbs. but have payload capacity of 40,000 lbs. — a ratio of 125 lbs. payload per 100 lbs. of unit weight.

Designed and built expressly for off-the-highway hauling, Rear-Dump and Bottom-Dump EUCLIDS are favored by contractors and industrial owners because of their speed, capacity and rugged simplicity. With modern, efficient loading units and high-speed, large-capacity Euclids, you can move earth, ore, rock and coal at less cost per ton on short and long hauls. Write us or your Euclid distributor for interesting facts and figures on dependable Euclid hauling equipment.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT
For EARTH ROCK COAL ORE

What's

your highway and airfield construction PROBLEM

THE SEAMAN PULVI-MIXER MAY BE YOUR ANSWER!

★

Jobs that couldn't be done; jobs that were costly and difficult; jobs that involved so much equipment and so many man-hours that the work was left unattended; — these are the jobs (and a multitude of different kinds) which today, are often readily and economically solved with the SEAMAN MIXER.

Space doesn't permit a full description; — hence this check-list. Look it over and write for details.

- ☐ Pulverizing old, rough sod to level and prepare for re-seeding.
- ☐ Preparing — in one tractor trip — a perfect seed-bed for grass or any planting.
- ☐ Faster, more economical, more thorough in place mixing of road materials.
- ☐ Aeration of aggregate; — of bituminous mix; or to dry out a deep muddy field condition.
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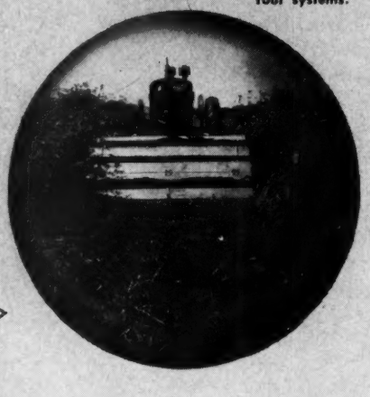
- ☐ Doubling yardage in widening shoulders using existing shoulder aggregate.
- ☐ Bituminous highway or runway maintenance.
- ☐ Pulverizing hard, frozen snow drifts.
- ☐ Removing ice from runways, streets, highways.
- ☐ Roadside mulching.
- ☐ Pulverization of soils prior to compaction in earth work.

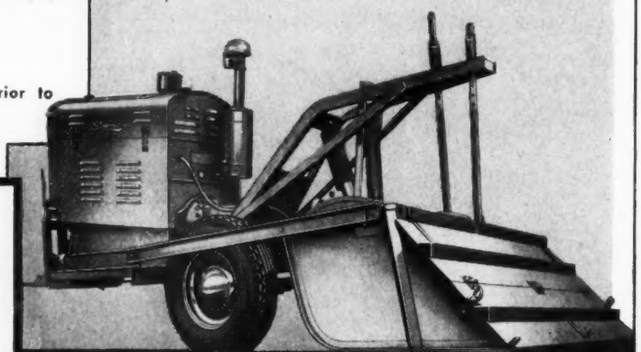
1. Pulverizing rough, uneven sod to level and prepare for new seeding.

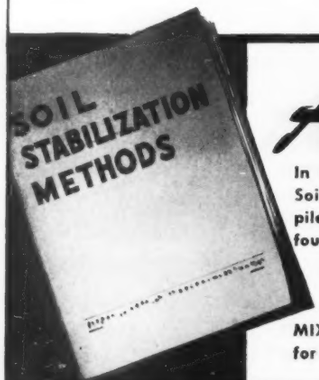
2. Mixing 6" bituminous base course for airfield runway.

3. Clearing land of weeds and brush and removing tangled root systems.



Highway and airfield engineers cite the SEAMAN PULVI-MIXER as the most comprehensive and useful equipment ever developed. A study of its astonishingly wide range of uses will be of profit to engineers, contractors and those directly concerned with airfield maintenance.





THE *Answer*

In this profusely illustrated book, Soil Stabilization Methods, compiled by Seaman engineers, will be found a description of modern practices in this field — and a detailed account of many uses for the SEAMAN MIXER. Write for your copy. Ask for Bulletin C-24.

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This tire leads a double life

A JOB our engineers did for the logging industry may save you money as soon as tires are more plentiful. Loggers had plenty of tire trouble. The tires that worked best on the rutted logging roads often failed when they hit smooth pavement and traveled at high speeds. The tires that worked on the pavement couldn't stand the gaff in the woods. Impact and bruise breaks were common.

B. F. Goodrich engineers tackled the problem. They designed and built a combination tire with more bruise-resistance and greater traction than a highway tire and one that is cooler running than an off-the-road tire. It's the "All-Purpose" Silvertown. They found it solved loggers' problems, and worked equally well in other operations where trucks worked on and off the pavement.

The "secret" of All-Purpose extra bruise-resistance is in the placing of *two extra breakers in the bottom of the carcass* in addition to two breakers *over* the plies. This gives *extra shock-resistance* in the critical area, *without* extra bulk to cause overheating.

On *off*-the-pavement work, the All-Purpose grips and is self-cleaning; its open design does not pick up stones. *On* hard surface pavements the broad, ample tread area gives full contact for smooth going *and* long wear . . . eliminates excessive pounding that causes localized hot spots and tread separation.

This new kind of tire is ideal for many types of *both* on-and-off-the-road trucking service. Supplies are limited, so place tentative orders early with the B. F. Goodrich dealer, or write us direct. *The B. F. Goodrich Co., Akron, Ohio.*

B.F. Goodrich
Truck & Bus Tires

What makes this Upson-Walton Wire Rope Snatch Block a Better Snatch Block?

HERE'S a safety-locking block . . . designed by Upson-Walton engineers . . . tested in actual use by leading contractors in this country and abroad—a *better* block and a *better* buy. Here's why:

EXTRA HEAVY ONE-PIECE STRAP with specially upset and forged eyes for link connections. An exclusive Upson-Walton process—a stronger strap. In addition, bending stresses in the pin are reduced because link spread design is narrower and a shorter pin can be used.

HEAVY STEEL SHELL PLATES with impressed guard to prevent rope from jamming between shell and sheave. Shell plates and strap riveted securely together.

EXTRA HEAVY CROSS HEADS, swivel links, safety links and pins.

DROP-FORGED HOIST HOOK CONNECTION made from specially selected fine grain steels for added strength and safety.

COLD ROLLED STEEL CENTER PINS and close tolerances between sheave bearing and pin result in longer life for the bearing—and the block.

HEAVY RIM AND TREAD SECTIONS IN SHEAVES provide greater resistance to rope wear.

AVAILABLE IN COMPLETE RANGE OF SIZES for various wire rope diameters.

ESTABLISHED 1871

As we go to Press, Deliveries on most sizes of Upson-Walton Snatch Blocks are good.

THE UPSON-WALTON COMPANY

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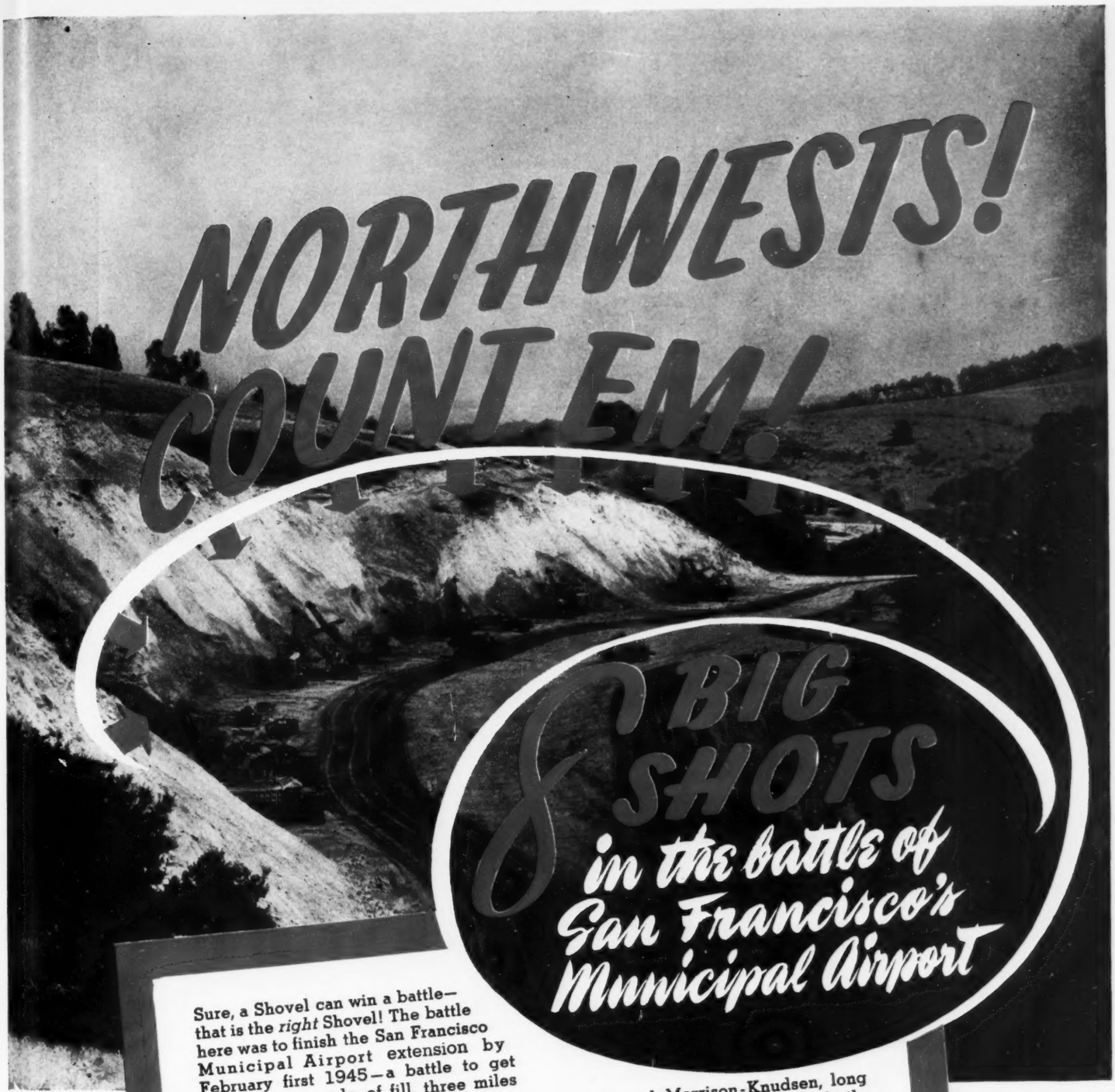


Sure, a Shovel can win a battle—that is the *right* Shovel! The battle here was to finish the San Francisco Municipal Airport extension by February first 1945—a battle to get 3,089,000 cu. yds. of fill, three miles over two main highways and a railway, all packed with traffic.

To do this over 250,000 additional cu. yds. had to be moved and an overpass built to assure the elimination of hauling delays.

This was one of those jobs where everything had to click. There was no room for delays on the part of temperamental machinery.

It is significant that Macco Construction Co. and Morrison-Knudsen, long time Northwest users, put their Northwests on the job and their faith was well justified in the completion of the fill well ahead of time.

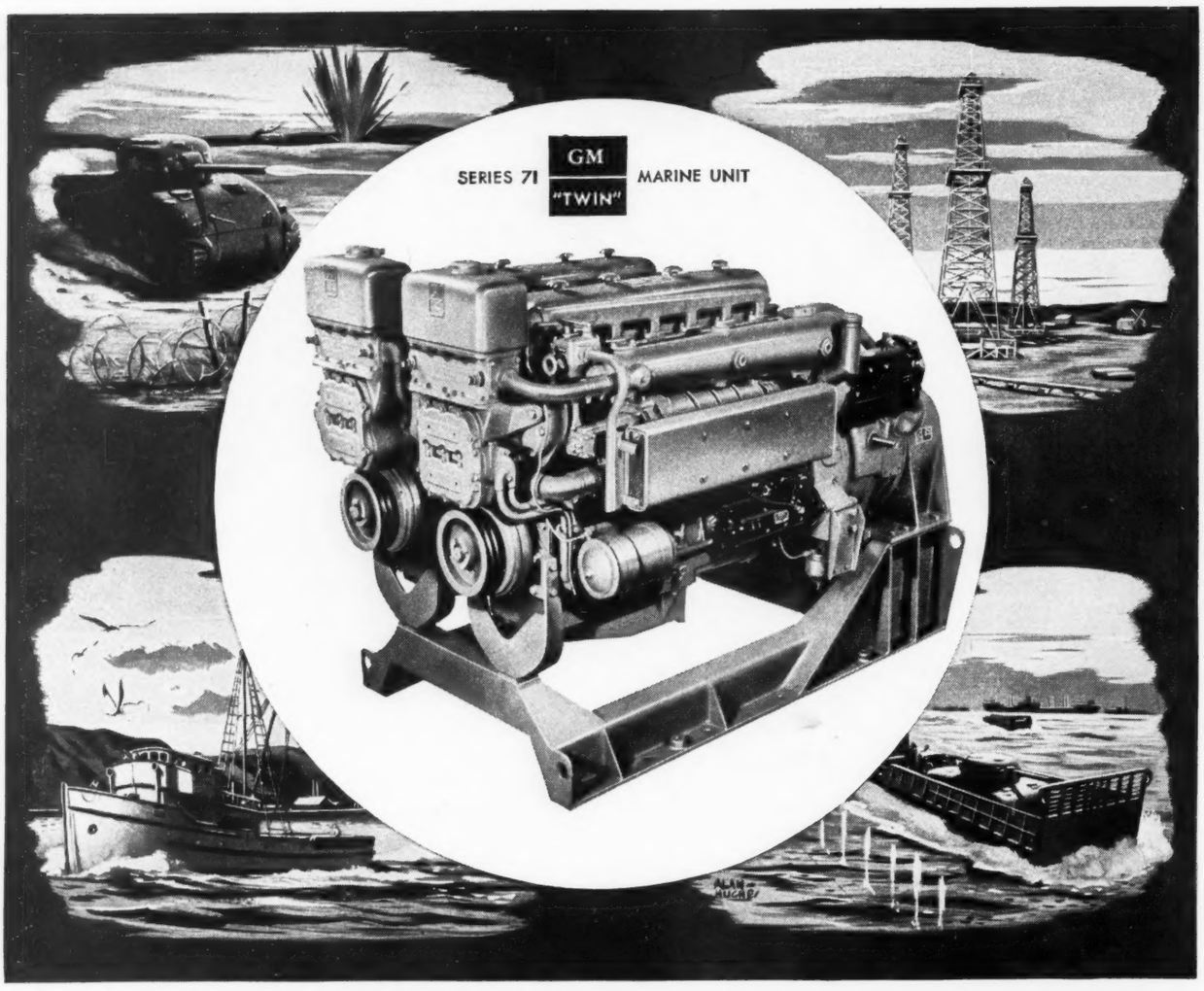
Dependable equipment is profitable equipment. Remember some of the things we have told you for your postwar contract plans. If you have a real Rock Shovel, you'll never have to worry about output in dirt.

NORTHWEST ENGINEERING COMPANY
1728 Steger Bldg., 28 E. Jackson Blvd., Chicago, 4 Ill.

-and when you have a real Rock Shovel you won't have to worry about output in dirt

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS



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This is a pair of General Motors series 71 Diesel engines built side by side, delivering their power through a single shaft. It is Detroit Diesel engineers' answer to an urgent call for a lot of dependable Diesel power in a small space.

Some of the jobs assigned the basic series 71 power units in "Singles," "Twins," and "Quads" are among the toughest on the books today—powering landing craft and driving Army M-3, M-4 tanks and M-10 tank destroyers.

It takes "oomph"—plenty of it—to plow a tank through hip-deep mud, to lift it out of shell craters, to keep it hot after the enemy—to beach and extricate a landing craft when the breakers are running high.

So it is easy to look ahead and see how these "multiple" Diesels will take hold of the countless jobs of industry and perform them equally well—particularly where the ratio of power to weight or space is of prime importance.

And remember, these "Twins" and "Quads," like the single sixes, share all the important developments which General Motors has contributed to Diesel science.

KEEP AMERICA STRONG
BUY MORE WAR BONDS

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DIESEL POWER

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ENGINES . . 150 to 2000 H. P. . . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES . . . . . ELECTRO-MOTIVE DIVISION, La Grange, Ill.

LIKE A CHAMPION SKIER . . .

FORM-SET ROPE IS *relaxed*

He races down the hillside, quickly gathering speed. Almost nonchalantly, the skier does his turn at a breakneck pace as plumes of feathered snow swirl up and away. He's graceful, effortless, sure . . . because he's *relaxed.*

There's a great deal of that same relaxed quality in Form-Set rope. Form-Set is Bethlehem's preformed, and wire rope in the preformed construction has been relieved of many internal stresses and strains; freed of the locked-in tension that sometimes shortens rope life.

The helical wires don't have a nervous urge to straighten themselves out. Cut a section of Form-Set rope and see what happens. *Nothing.* The wires and strands lie just as they were. They don't pop loose or "wicker."

What's all this add up to? First, longer life (savings for *you*). Second, easy handling (something your *crews* will like). Third, better performance (and that's what everybody wants).

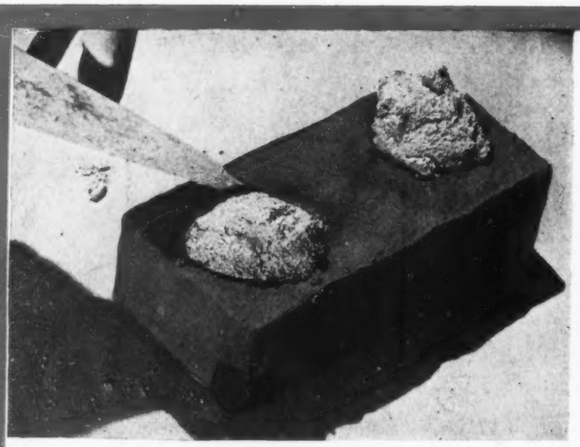
There's real dollar value in Bethlehem Form-Set. On scores of applications subjecting the lines to serious bending fatigue, the preforming process actually adds rope life. This saves you money in the long run. Why not prove it to your own satisfaction with a trial length of Form-Set*—the rope that's *relaxed?*

**All grades, constructions, and sizes of Bethlehem Wire Rope can be supplied with the Form-Set feature.*

When you think WIRE ROPE . . . think BETHLEHEM

BRIXMENT MORTAR

Has Better Water-Retention



Here's the way to test for high water-retention. Slap a small dab of any two mortars onto a brick. Wait a minute, then feel each dab. The one that stays plastic longest will be the one *having the* highest water-retention. *Try this with Brixment mortar!*

—AND HIGH WATER-RETENTION IS ESSENTIAL TO WELL-BONDED, WATERTIGHT MASONRY

Water-retaining capacity is the ability of a mortar to retain its moisture, and hence its plasticity, when spread out on porous brick. ● High water-retaining capacity is of *extreme importance* in mortar. If the mortar does not have high water-retaining capacity, it is too quickly sucked dry by the brick; the mortar stiffens too soon, the brick cannot be properly bedded, and a good bond cannot be obtained.

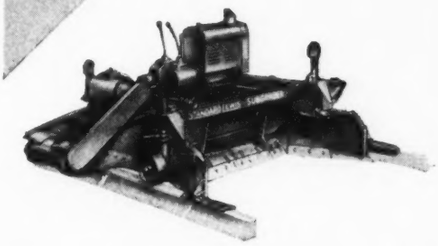
Brixment mortar has extremely high water-retaining capacity. It strongly resists the sucking action of the brick. Brixment mortar therefore stays smooth and plastic longer, when spread out on the wall. *This permits a more thorough bedding of the brick, and a more complete contact between the brick and the mortar.* The result is a better bond, and hence a stronger and more *water-tight wall.*

LOUISVILLE CEMENT CO., Incorporated, LOUISVILLE 2, KENTUCKY

CEMENT MANUFACTURERS SINCE 1830

12,000

LINEAL FEET OF FINISHED 25 FOOT SUBGRADE IN 8 HOURS



THAT'S A BROAD CLAIM TO MAKE!

But it's based on fact—an actual job record of the STANDARD-LEWIS Subgrader on four 25-foot runways that had to be built in a hurry. In this speedy operation, the STANDARD-LEWIS Subgrader bailed material at the rate of 8 yards per minute and produced a finely finished and accurate subgrade from side form to side form.

FEATURES

1-Quickly adjustable to variable digging depths. 2-Cuts in either direction without turning. 3-Works around curves without binding and tows sideways through narrow places. 4-Digs right up to the side forms, eliminating hand cleaning. 5-Simple lever adjustment for spoiling at either side.

OTHER STANDARD PRODUCTS

ASPHALT PLANTS • BATCHING PLANTS • ASPHALT FINISHERS • CONCRETE FINISHERS • LOADERS ROLLERS • POWER BROOMS

GET THE WHOLE STORY— SEND FOR THIS BULLETIN

STANDARD STEEL CORPORATION

General Offices and Plant: 5001 South Boyle Avenue
Los Angeles 11, California
Distributors Throughout United States and Canada

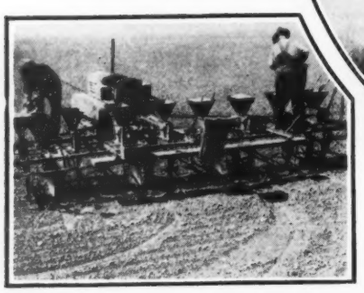
GIVE "THE MAN WHO DOES THE WORK"

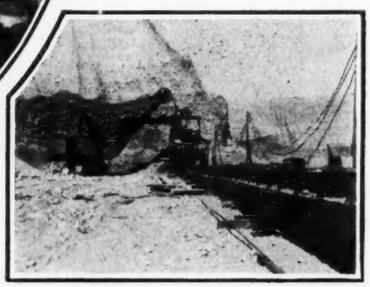
MIR-O-COL HARD-FACING METALS

for SMOOTH FLOWING "TOUGH HARDNESS"

Whatever the job, Mir-O-Col Hard-Facing is industry's best weapon to fight the incessant battle against abrasion, impact, and frictional heat which cause rapid wear of vital equipment parts.

How to apply hard-facing by either acetylene or electric arc welding process is outlined in our new, graphically illustrated booklet, "Weldors Guide to Successful Hard-Facing." Free copy will be sent on request.





A SMOOTH FLOWING deposit, with a minimum of porosity, is assured when Mir-O-Col hard-facing is applied, whether by acetylene or electric method. Mir-O-Col is equally easy to apply to old, worn out surfaces of equipment or to new parts prior to initial use. All Mir-O-Col rods are flux coated to insure better hard-facing results with minimum splatter loss and maximum deposition. Mir-O-Col quality is backed by 22 years of "know how."

"TOUGH HARDNESS" is the essential quality in hard-facing for greatest resistance to both abrasion and impact. For most hard-facing purposes, specify Mir-O-Col Production Rod—a versatile alloy combining the highest degree of hardness possible without sacrificing resistance to impact or shock. For a job where abrasion is extremely high but impact comparatively moderate, use Mir-O-Col Special Rod. For corrosion resistance, Mir-O-Col valverod.

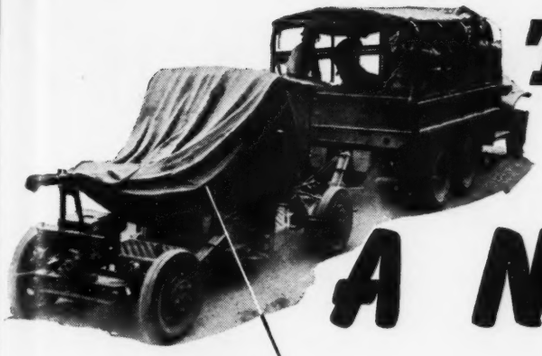
MIR- HARD RODS FACING **-COL**

Manufactured by

MIR-O-COL ALLOY CO.

2416-60 EAST 53rd STREET
LOS ANGELES 11, CALIFORNIA

"ON-THE-JOB" TESTS PROVE MIR-O-COL QUALITY



The War Showed the World A NEW CANVAS

Picture a more gruelling test for cotton duck, first cousin to gun cotton in burning qualities; subject to the same natural deterioration as any organic matter in the elements; victim of the virile mildew fungus.

Yet that same cotton duck has gone to war. Resisted every incendiary that the enemy could throw over; every deteriorating influence that the swamps of Guadalcanal, the deserts of North Africa, the bleak winds of Iceland and Russia, and the salt spray and tropical heat and rains of the South Pacific could muster.

But, of course, that cotton duck was FIRE CHIEF-treated Canvas — the original fire-, water-, weather- and mildew-resistant HOOPERWOOD "Engineered Canvas."

What does this triumph of "Canvas Engineering" hold for the post-war world? Many things, among which are: construction windbreaks that hot rivets or welding torches won't ignite . . . awnings that won't burn, mildew and rot . . . truck covers outlasting their predecessors several times over . . . ships' hatch covers and lifeboat covers that present no fire hazard . . . and many other superior canvas products.

If you are interested, write for new bulletin, "War Proved for Post-War Service."

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.

Since 1800 (through six wars) the HOOPER name has symbolized highest quality in Cotton Duck and other Heavy Cotton Fabrics, Paper Mill Dryer Felts, Filter Cloth, Rope, Sash Cord.

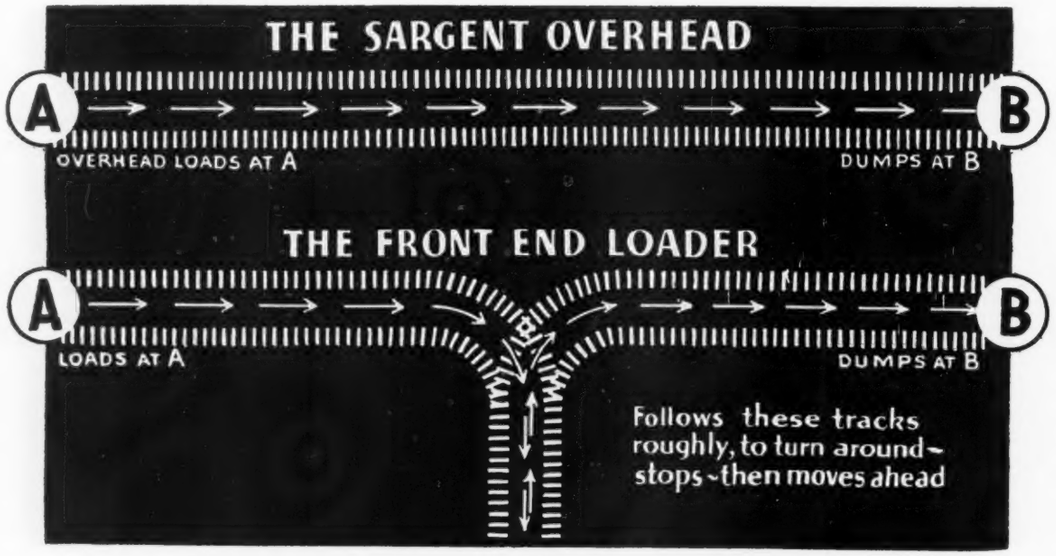
• Fire-Chief Finished (PATENTED) •

HOOPERWOOD COTTON DUCK

Here's *HOW* the SARGENT OVERHEAD *is superior to the Front End Loader*

1. It's faster.
2. There's no twisting and turning to ruin tractor running gear.
3. Operator can dump load in any spot in truck.
4. Operator can see what he's doing at all times.
5. In road maintenance and snow removal the Overhead allows flow of traffic.
6. The Sargent Overhead works at normal speed in narrow places where there is no room for twisting and turning.

HERE'S *WHY* THE SARGENT OVERHEAD *is superior to the Front End Loader*



Mfd. by

MAINE STEEL
INCORPORATED
SOUTH PORTLAND MAINE

WHEN IS AN EXCAVATOR NEW?

WHEN WPB Order L-192 is amended or rescinded to permit resumption of normal commercial sale of shovels and cranes, Byers will offer the construction industry a line of new and greatly improved excavators.

In capacities from ⅜ through 1 cu. yd., the Byers postwar line has been built up to provide excavator performance such as will be required in an era of high operating costs, competitive bidding and narrow margins, where profit depends principally on the use of profit-earning equipment.

The only model in Byers present wartime line which will be offered for postwar sale is the reliable ¾ yd. Byers Model 83 . . . and it is undergoing engineering improvements to help it exceed its remarkable prewar performance records.

All other models will be "new" to most private contractors and political purchasers because they will not have seen them before. But they will no longer be "new" to war contractors and government agencies who will have used them on severe wartime service. It is from this world-wide proving ground that Byers engineers are now checking performance, wear and maintenance to assure you of thoroughly tested, proved and approved new shovels and cranes you will be eager to own and use.

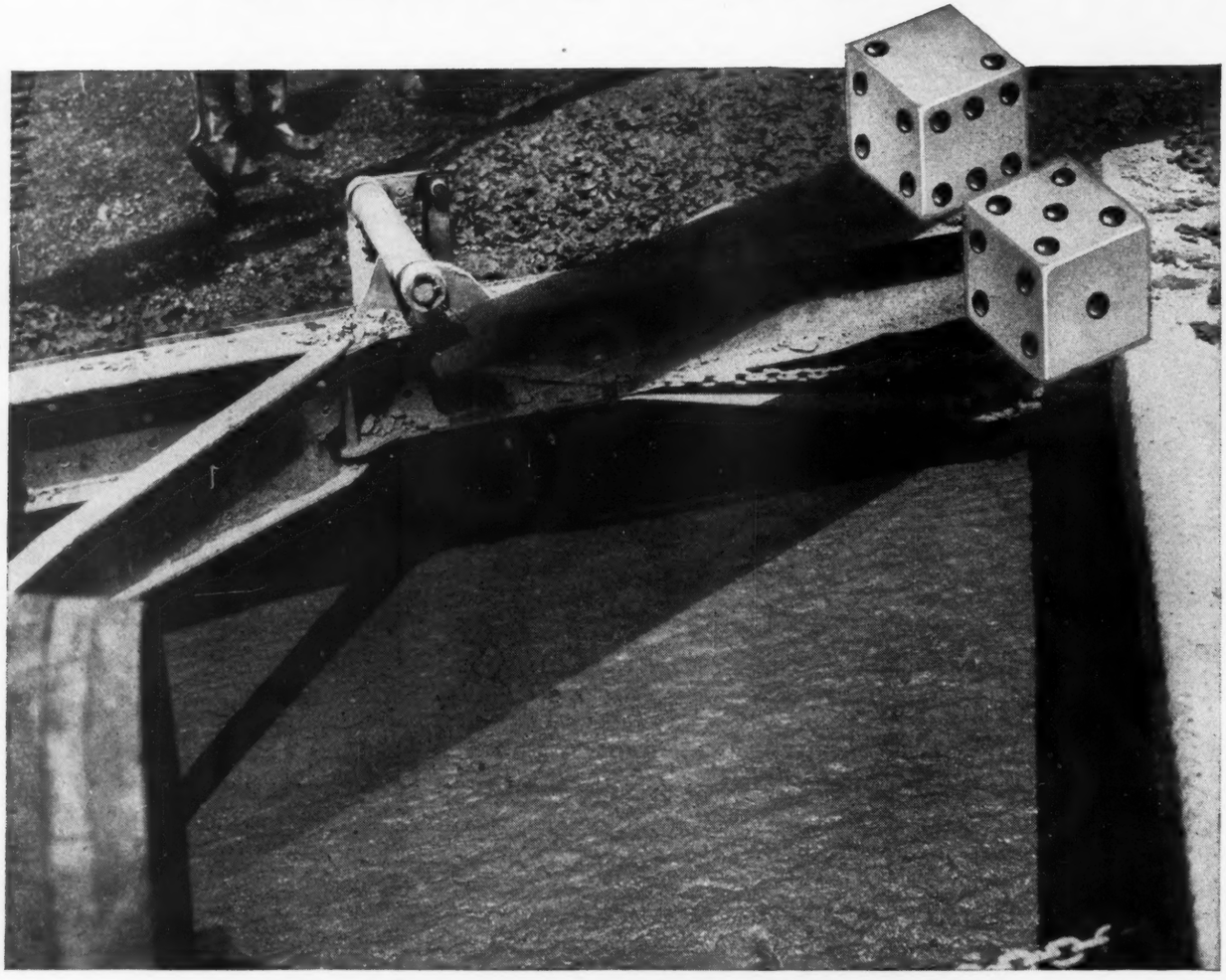
For full information, contact the Byers distributor near you.

THE BYERS MACHINE CO.

★ Ravenna, Ohio ★

Distributed throughout the World

With only one pass!



Concrete after first and only pass *of finishing machine on Army airport paving project. L. G. Defelice & Son, Inc., contractor, North Haven, Conn.*

Here's how a contractor saved time and money. He used Atlas Duraplastic, the air-entraining portland cement that makes concrete more workable and practically eliminates segregation and bleeding. He reports—

Only one pass of the screeding machine was necessary to produce a desirable surface for finishing.

Finishers floated, edged and jointed the concrete surface immediately behind the screeding operation.

This saved time and expense at the termination of each day's concreting.

Atlas Duraplastic requires no additional materials and makes better concrete at no extra cost.

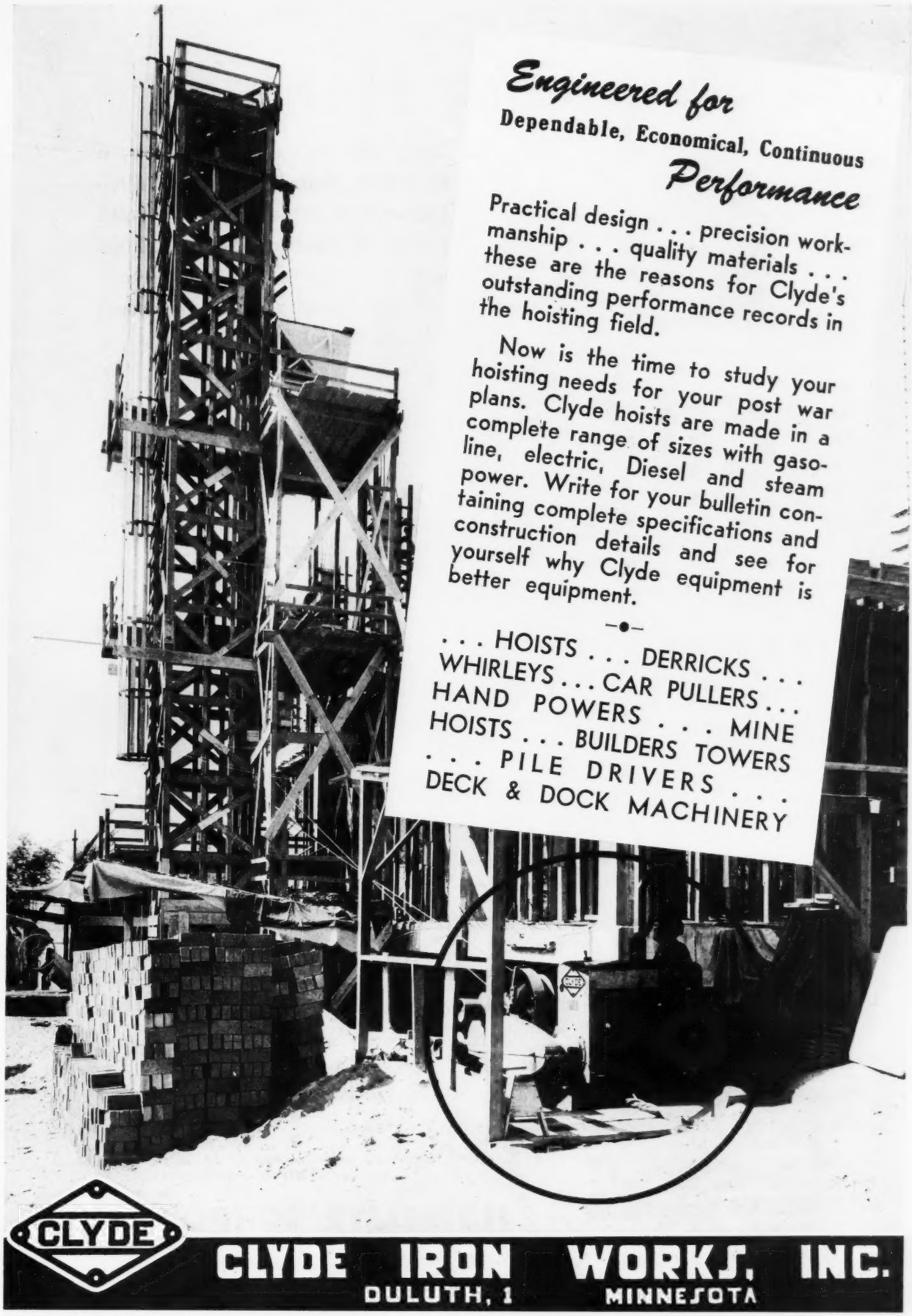
Send for further information. Write to Technical Service Bureau, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 135 East 42nd St., New York 17, N. Y.

OFFICES: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco. CM-D-16

ATLAS DURAPLASTIC

TRADE MARK REG. U. A. C. CO.

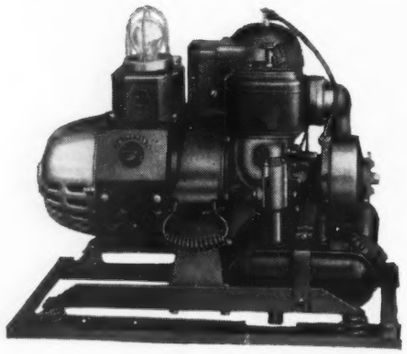
The Air-Entraining Portland Cement That Makes Concrete More Durable and More Plastic


Engineered for
Dependable, Economical, Continuous
Performance
Practical design . . . precision workmanship . . . quality materials . . . these are the reasons for Clyde's outstanding performance records in the hoisting field.
Now is the time to study your hoisting needs for your post war plans. Clyde hoists are made in a complete range of sizes with gasoline, electric, Diesel and steam power. Write for your bulletin containing complete specifications and construction details and see for yourself why Clyde equipment is better equipment.
. . . HOISTS . . . DERRICKS . . . WHIRLEYS . . . CAR PULLERS . . . HAND POWERS . . . MINE HOISTS . . . BUILDERS TOWERS . . . PILE DRIVERS . . . DECK & DOCK MACHINERY
CLYDE
CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA

LIGHT

BRIGHT
and
RIGHT

Only 100 pounds complete, a Homelite Gasoline-Engine-Driven Generator has the power to furnish plenty of electric power . . . 2000 watts . . . enough to operate brilliant floodlights so necessary to keep the night shift going. ✳



A Homelite Portable Generator is *right* from the standpoint of design and construction. Light, compact, rugged, easy to start, easy to operate, easy to keep in top condition, and extremely dependable at all times.

✳ **Just one of many uses for a Homelite. Send for our new booklet showing all the time-saving uses of Homelite Portable Generators, Pumps, and Blowers.**

HOMELITE CORPORATION
Portable **PUMPS • GENERATORS • BLOWERS**
PORT CHESTER, NEW YORK

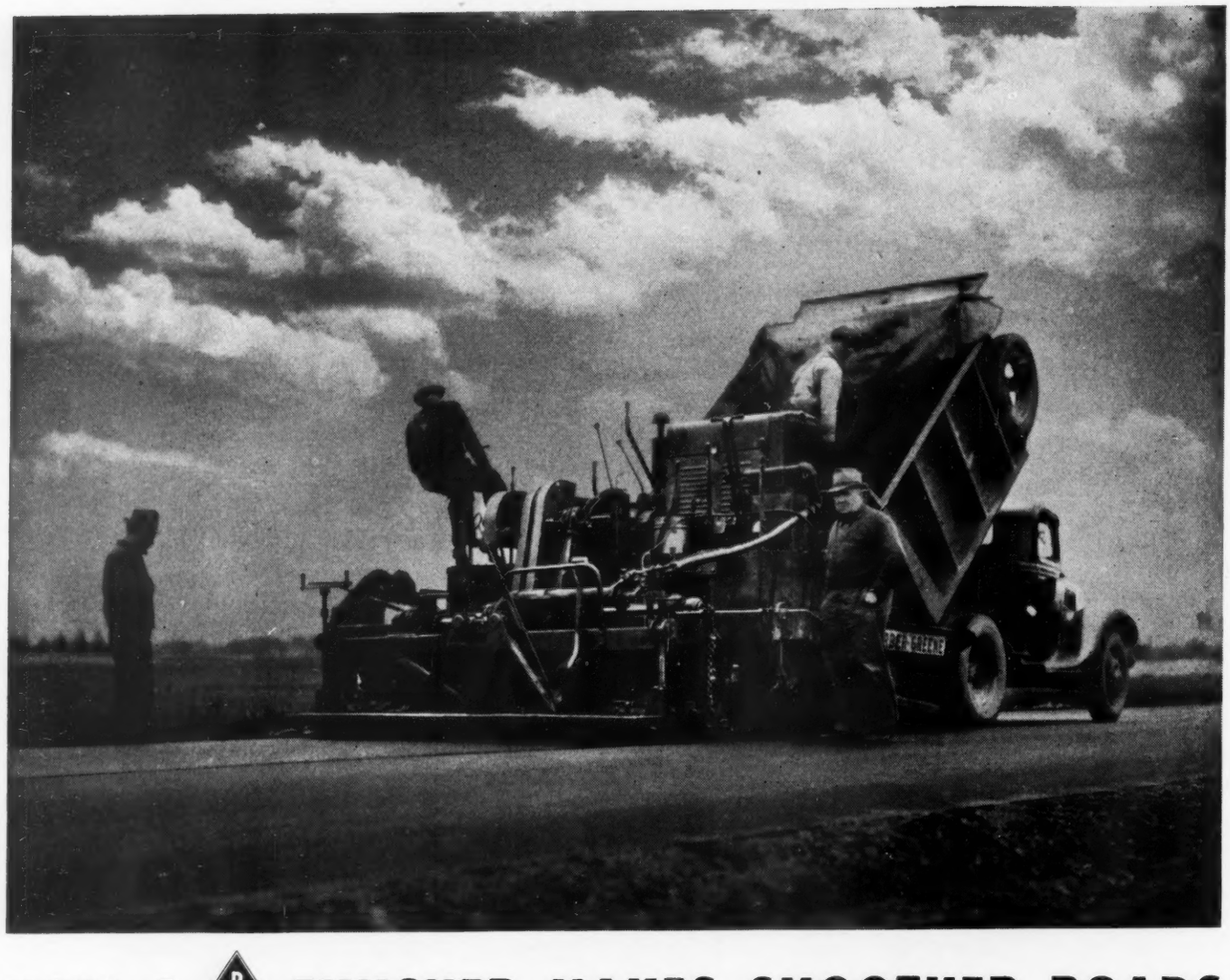
Any chef will tell you he can mix and boil, and stir and season, but he can't get the best from his recipe unless he combines his experience and skill and knowledge with the ingredients he so carefully chooses. And it's that way in our own business, too! We season your specifications with our own long helpful experience, we mix common sense with an understanding of your problem, we make use of the basic ingredients of willingness and "know-how" to produce a better job faster! Indeed, there isn't any shortage of *service* on the daily Levinson menu!

LEVINSON STEEL

The LEVINSON STEEL CO.

PITTSBURGH, PA.

L S-2



HOW A B G FINISHER MAKES SMOOTHER ROADS

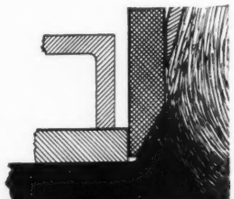
Here's a way to get a well packed surface without springy spots. An asphalt mat laid down with a Barber-Greene Tamping-Leveling Finisher is smooth, *firm*.

In many cases, a 5-ton roller adds only about an eighth of an inch compaction to the material *tamped* by a Barber-Greene. What's more, depressions in the base are not reflected in the finished surface. *The mat is equally packed over every variation in the subgrade.*

Hammering the hot mix 1200 times a minute, the bevelled face of the tamping bar actually compacts the material while striking it off. And to produce a mat of uniform density, the compacted mix is pushed forward and downward simultaneously.

In addition, the creeping travel of the tamper imparts a rolling movement to the loose mix in the spreading chamber. This prevents segregation of the material. And the weight of the follow-up screed — level with the stroking depth of the tamping bar — completes compaction . . . leaves a smooth, table-top surface.

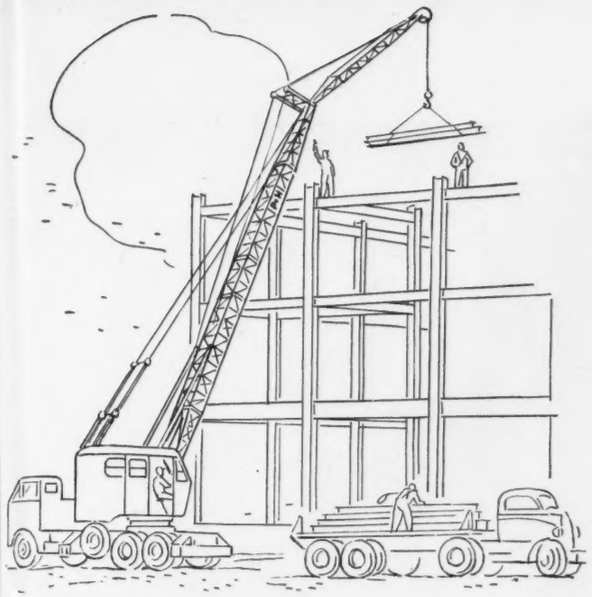
A Barber-Greene *Tamping-Leveling* Finisher will help you build better, smoother, lower-cost roads. Write for B-G Finisher Catalog. Barber-Greene Company, Aurora, Illinois.



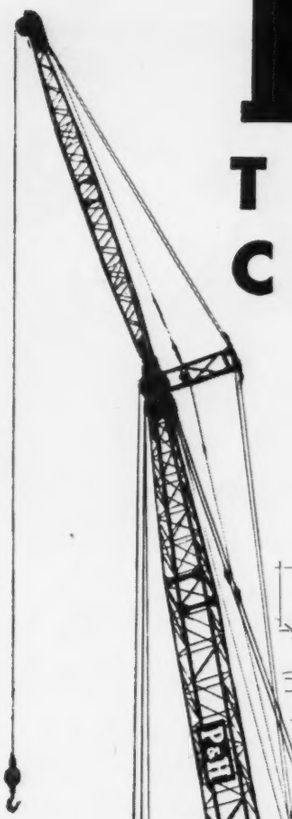
The tamping bar on a Barber-Greene Finisher compacts the hot mix while striking it off. Material is pushed forward and downward at the same time to fill all the voids in an uneven subgrade. A mat of equal density throughout is produced.

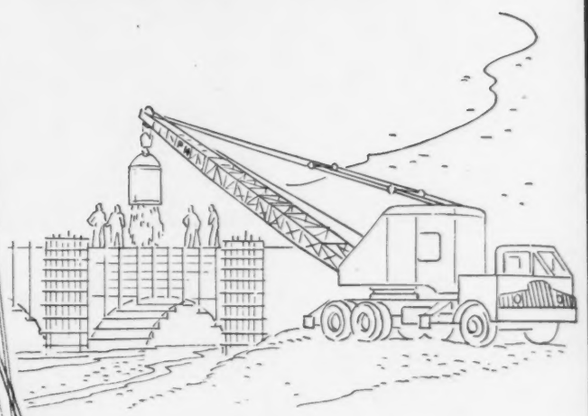
45-4

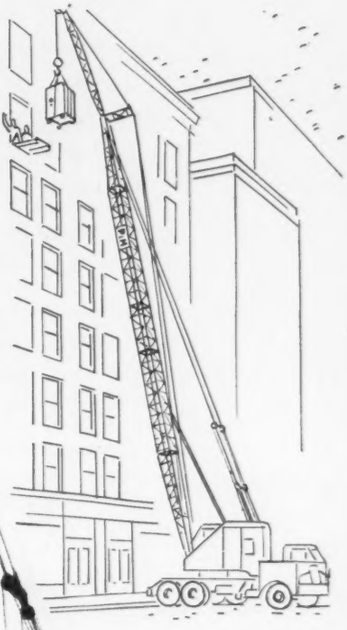
Barber-Greene B G *Constant Flow Equipment*



P&H TRUCK CRANES







What do You have to Handle in a HURRY?

In the new P&H truck cranes you have a combination of advantages never before known in a mobile type crane. Here's the ability to get from place to place quickly — through congested city areas or over the highways — wherever there's a job to be handled efficiently and economically.

Here are a few of P&H's exclusive features:

PLANETARY LOWERING—permits operator to "inch" loads accurately and safely, *under power!*

PLANETARY BOOM HOIST—provides quick, safe raising and lowering of boom — *under power.*

TORSION-BAR MOUNTED FRONT AXLES — provide greater stability—greater flexibility to handle all kinds of loads.

HYDRAULIC CONTROL—assures instant, positive response for easier, safer operation.

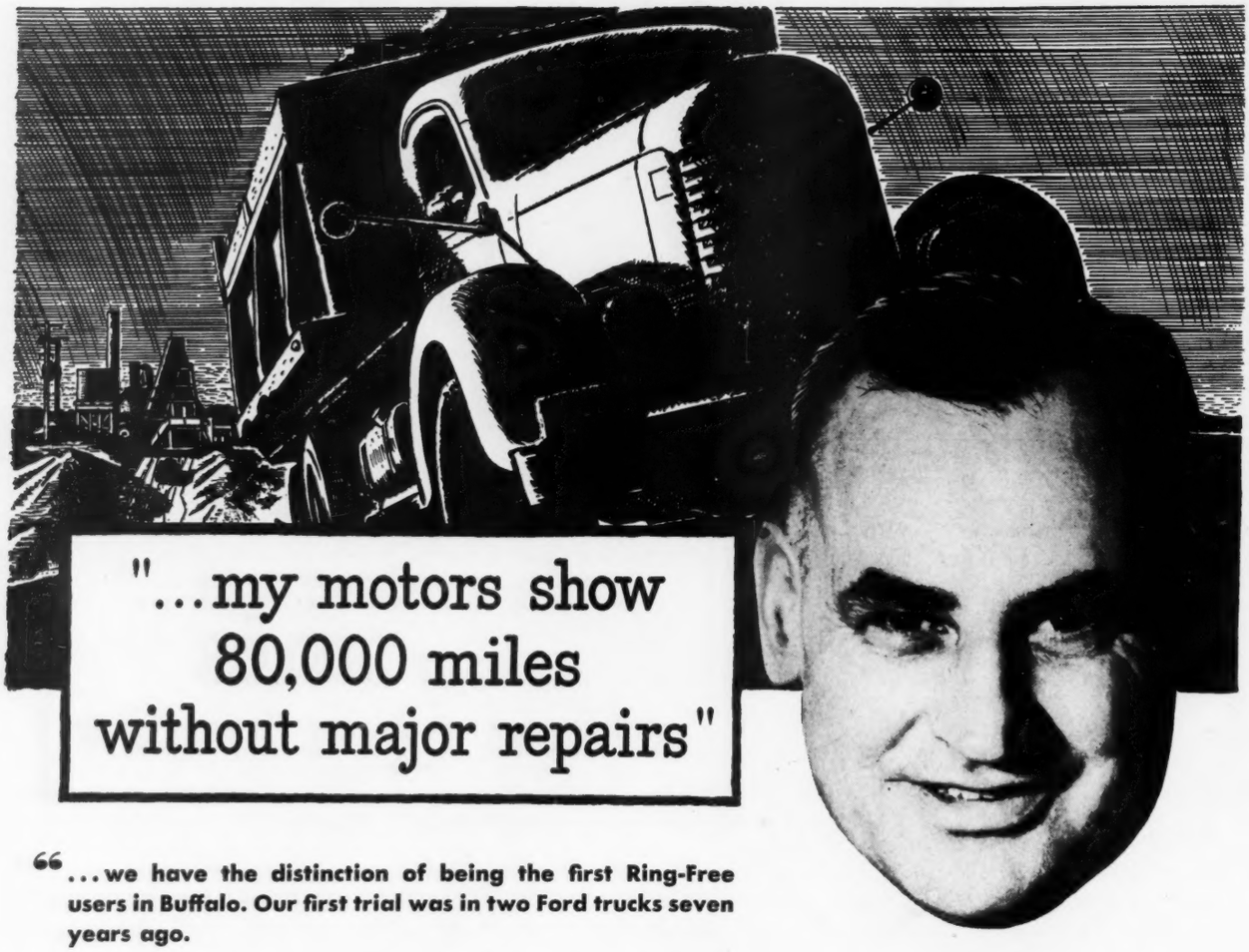
These are but a few *exclusive* features. There's also P&H's all-welded construction of rolled alloy steels for extra strength in resisting stresses and strains. Modern design provides better weight distribution — eliminates excess dead weight — provides a higher ratio of lifting capacity to gross weight with maximum safety. That's why, size for size, no P&H truck crane has ever been outlifted!

Write for your copy of bulletin TX-87. It gives you the facts you'll want to know — facts that make P&H the outstanding truck crane of the day.

General Offices: 4494 West National Avenue, Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

HOISTS · WELDING ELECTRODES · MOTORS P&H EXCAVATORS · ELECTRIC CRANES · ARC WELDERS



"...my motors show 80,000 miles without major repairs"

"...we have the distinction of being the first Ring-Free users in Buffalo. Our first trial was in two Ford trucks seven years ago.

...our fleet has increased to fourteen trucks including Autocars, Internationals, Fords and one Chevrolet.

...trucks are all used in hauling sand and gravel...the hardest kind of work on trucks as roads are bad...loads are heavy. Due to conditions there is a constant uneven strain on motor bearings.

...if Ring-Free did not have a tough film strength that protected these bearings my motors would not be able to show 80,000 miles without major repairs as many of them have.

...Ring-Free's ability to penetrate even to the top of the pistons and keep the upper rings free gives my motors all the power they were intended to have.

...my first International truck went 110,000 miles with only $50 repairs...proper lubrication was responsible."

Excerpts from letter of–

George Muehlbauer

George Muehlbauer
205 Courtland Avenue
Buffalo, New York

MACMILLAN RING-FREE MOTOR OIL

Operators of all types of equipment report lower-cost, more efficient performance with Ring-Free Motor Oil. Find out how Ring-Free can help lick your toughest lubrication problems. ... Phone or write the nearest Macmillan office.

MACMILLAN PETROLEUM CORPORATION

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GAR WOOD EQUIPMENT

FIGHTING ON EVERY FRONT

Material handling Crane.
Signal Corps Photo

Cable Bulldozer.

Hi-Lift Cargo Plane Loader.
© *International News Photo Service*

Giant Truck Body with automatic downfold tailgate.

Telescopic Hydraulic Hoist.

Somewhere off in the far Pacific . . . on the hard fought battlefields of Europe . . . in Asia . . . Africa . . . anywhere, you name it . . . that's where Gar Wood equipment is serving Allied Forces in a hundred different ways. Famed Bulldozers with a colorful history, earth-moving Scrapers, tireless Winches, Wrecker Cranes, Hi-Lift Plane Loaders, Hydraulic Hoists, Dump Bodies, gasoline, oil and water Truck Tanks . . . these and many others are the wartime products of Gar Wood. Each of the six divisions of Gar Wood Industries, Inc. specializes in its field, and each division is busy producing the fighting equipment it knows best how to build.

When Victory has been won, Gar Wood Equipment will again be available for civilian use. All the experience accumulated in years of peacetime will be combined with new wartime developments to bring you better-than-ever Gar Wood Equipment.

GAR WOOD GW INDUSTRIES, INC. TRADE MARK

GAR WOOD INDUSTRIES, INC.

DETROIT 11, MICH.

WORLD'S LARGEST MANUFACTURER OF TRUCK AND TRAILER EQUIPMENT

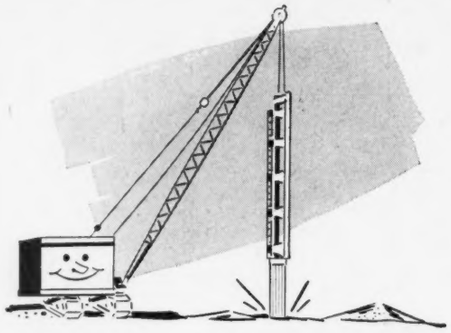
HOISTS AND BODIES • WINCHES AND CRANES • TANKS • ROAD MACHINERY • HEATING EQUIPMENT • MOTOR BOATS

MONOTUBES

For Highway and Railroad Bridges, Buildings, Marine Construction, etc.

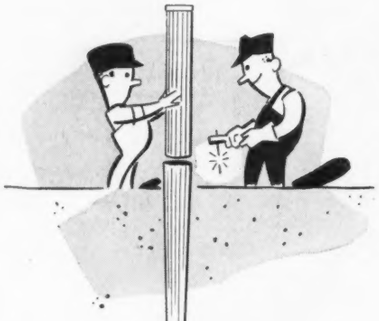
EASY TO HANDLE

Fast, economical handling possible because of their light weight.



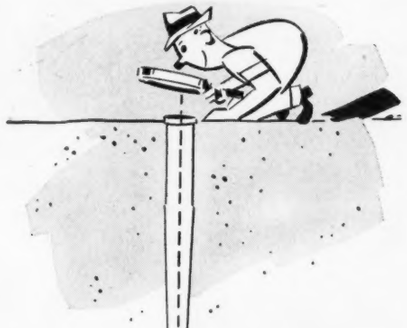
EASY TO DRIVE

Tapered, fluted construction permits faster driving with average job equipment.



EASY TO EXTEND

Quick, easy extensions on the job — even in low head room.



EASY TO INSPECT

Tubular design results in rapid, sure inspection before concreting.

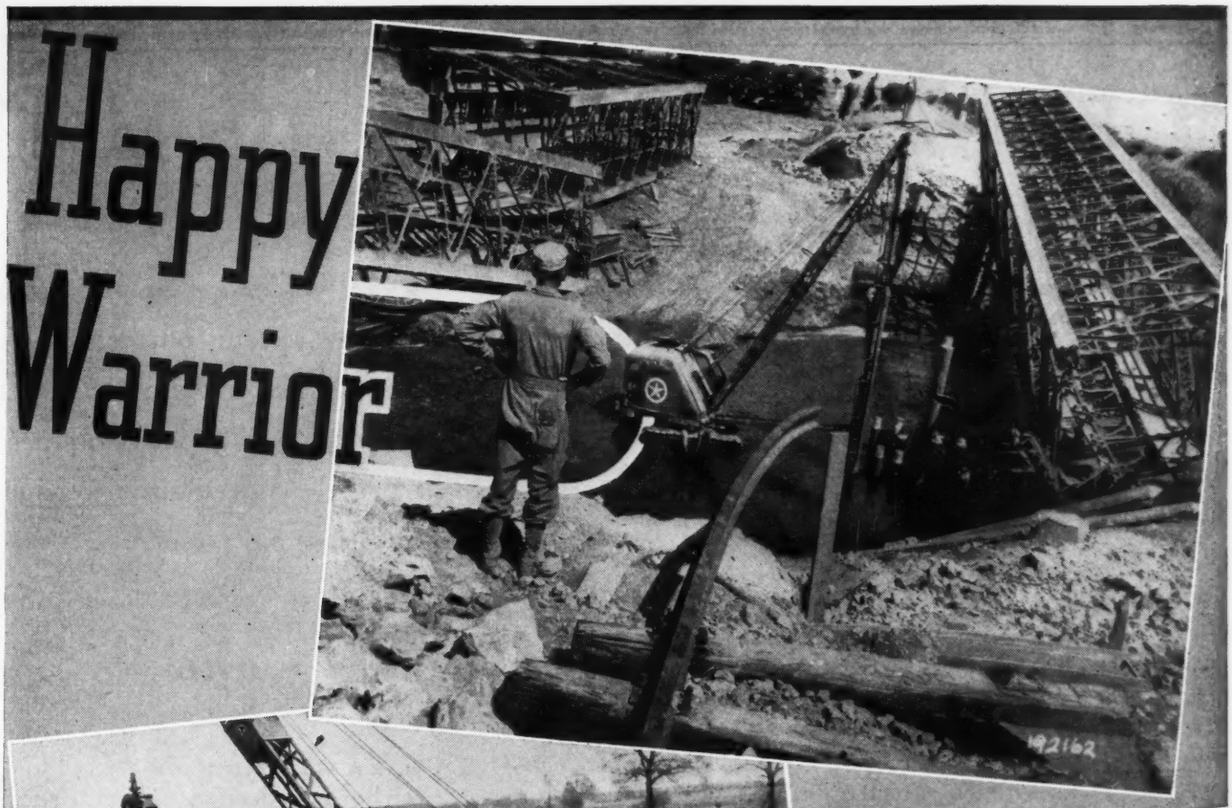
—FIRST IN FOUNDATIONS!

THESE special advantages of Monotube tapered piles have made them time and money-savers on many jobs — large and small—all over the country. If *light weight* plus *strength* plus *fast-driving* plus *integrity* will help you—specify Monotubes the next time you install piled foundations. Available in gauge, size and taper to meet varied requirements. Write The Union Metal Manufacturing Company, Canton 5, Ohio, for free catalog and complete details.

UNION METAL

Monotube Tapered Piles

Happy Warrior



The Buckeye Clipper *enjoys* its war-time role of helping the Allies on all war fronts, judging by the endless gruelling jobs it does *without complaint*, according to eyewitness accounts. A T/4 in the Army Engineers hit the nail on the head when he called the Clipper "A Happy Warrior."

Every Clipper is equipped with *Mevac* Vacuum Power Control which speeds up and smooths out crowd, hoist, swing and travel, is easier on the transmissions and engine and greatly reduces operator fatigue. Proved in war, you'll profit with Clippers in the post-war era. Send for 24-page book — "The Age of Clippers."

Quickly Convertible to Shovel, Trench Hoe, Dragline

Built by Buckeye

Buckeye Traction Ditcher Co., Findlay, Ohio

Convertible Shovels

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Tractor Equipment

Road Wideners

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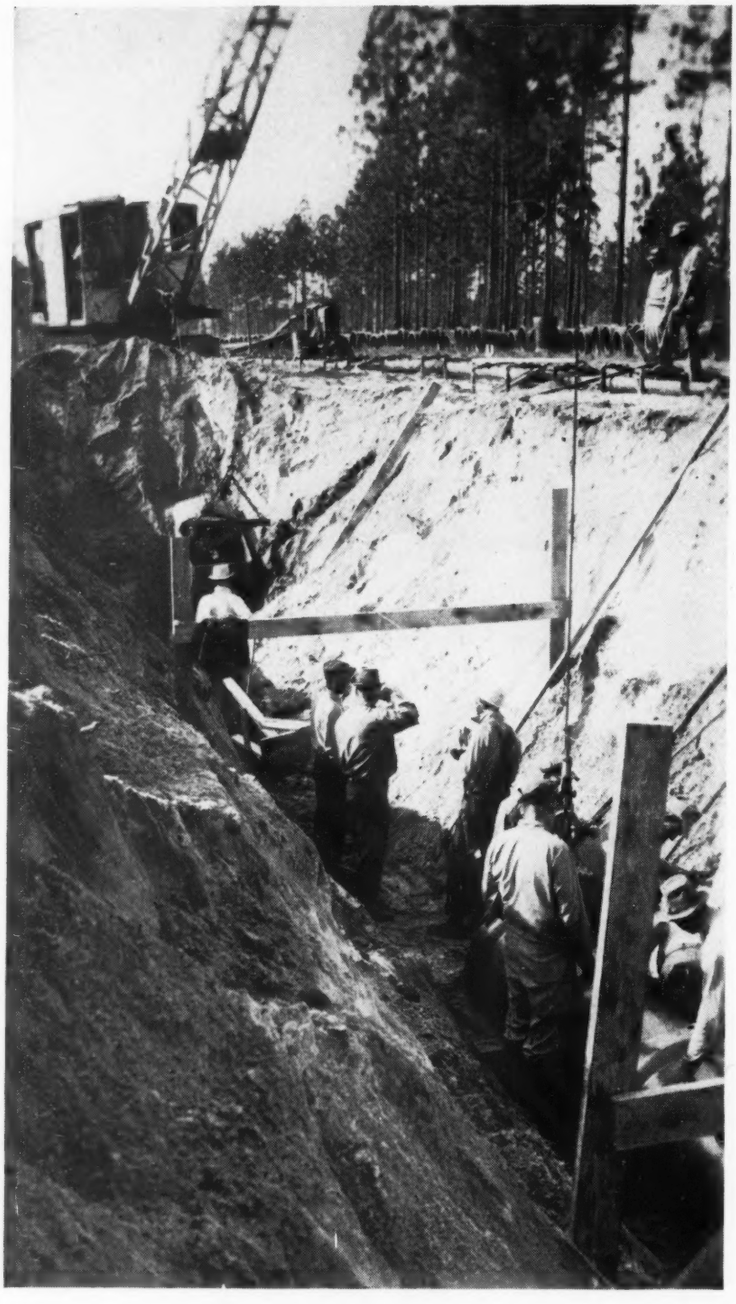
"GET MORETRENCH AGAIN"



IN 1944, more than fifty per cent of our business came from old customers. Time after time when Wellpoint Equipment is needed to predrain a wet job, they order Moretrench,

and

Without a doubt, repeat orders are the truest measure of a product's worth.

When you need a Wellpoint System, get the one that guarantees results — Moretrench! It's a time and money saver on every wet job.

★ ★

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2 Reasons why

RED LEAD

means Extra Rust Protection . . .

Why is Red Lead so widely accepted throughout industry as *The* metal protective paint?

Why are paints containing Red Lead so generally specified for safeguarding metal surfaces from the costly ravages of rust?

The reasons are many, but none are more noteworthy than Red Lead's ability to counteract acid conditions and to halt electrochemical action—both prime causes of rusting—as explained at right.

Still another important advantage of Red Lead is that it partially combines with the usual vehicles to form compounds generally known as "lead soaps." Due to their composition and the individual way in which these compounds form, the film obtained is highly water-resistant. In addition, lead soaps contribute to the formation of tough, elastic films that "stick on the job."

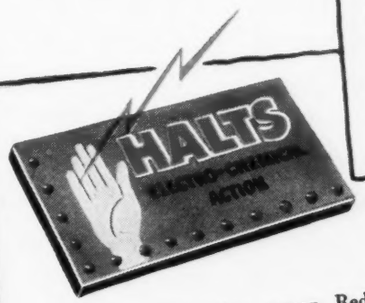
Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including phenolic and alkyd resin types.

Specify Red Lead for ALL Metal Paints

The value of Red Lead as a rust preventive is most fully realized in a metal paint where it is the only pigment used. However its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better metal paint if it contains Red Lead.

NEUTRALIZES ACID

1 Red Lead has the ability to counteract acid conditions which are recognized as accelerators of rust. Structural steel is exposed to such environments because acid forming compounds are carried by the atmosphere in the form of gas, smoke and moisture. Red Lead has a neutralizing effect on these conditions as it is essentially a *basic* pigment with the ability to develop and maintain, for a prolonged time, a mild alkaline environment at the surface of the metal. Authoritative tests show that, as a result, Red Lead inhibits the process of corrosion. In short, metal paints, too, should "stay on the alkaline side."



2 Another outstanding reason Red Lead means *extra* rust protection is the unique way it shields metal surfaces with a protective film. Rusting is fundamentally an electrochemical process in which weak currents are generated which cause iron to become soluble in the lowest state of oxidation. Red Lead has properties through which this iron is rapidly converted to a stable compound that forms an adherent film. The formation of this protective shield halts electrochemical action, thus preventing further corrosion.

Write for New Booklet

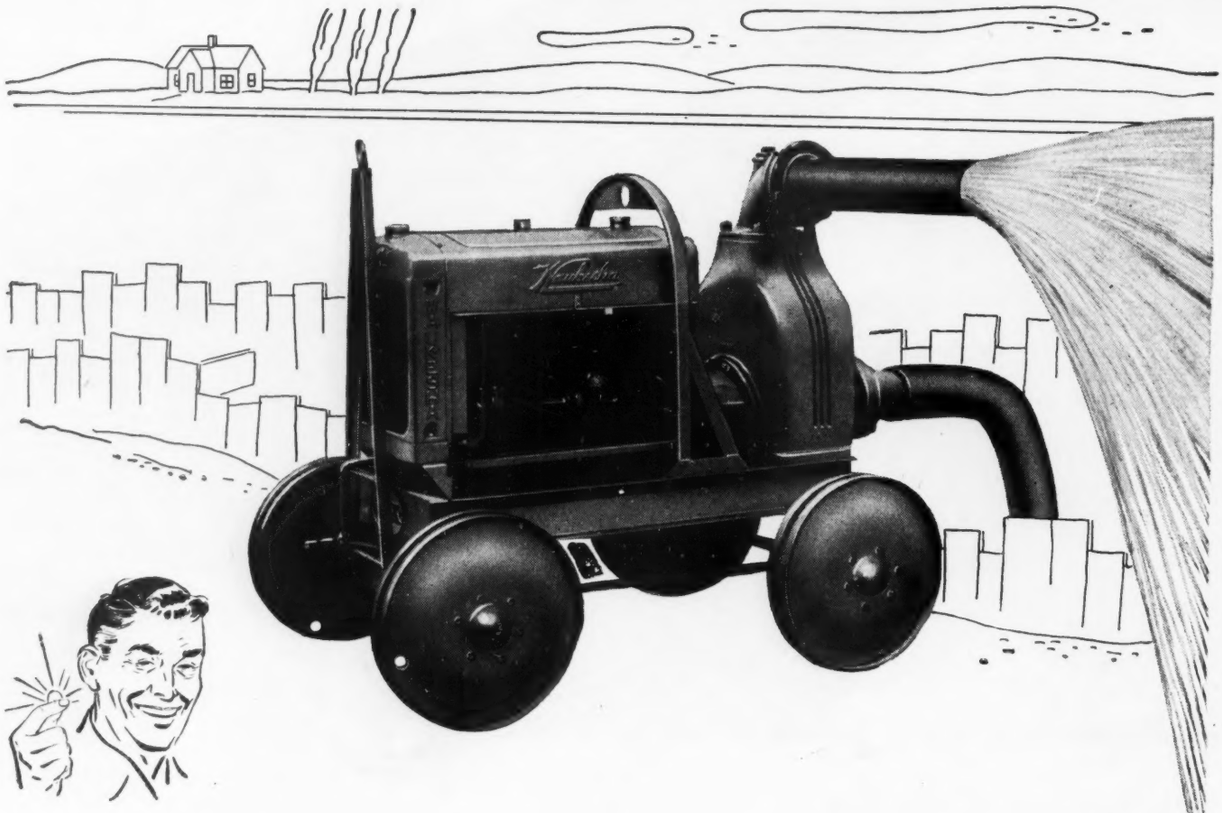
"Red Lead in Corrosion Resistant Paints" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior metal protection. It also includes typical specification formulas. If you haven't received your copy, address nearest branch listed below.

* * *

The benefit of our extensive experience with metal paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 10, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.)

DUTCH BOY RED LEAD



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"Yes, sir, that's all you need to do with a Rex Speed Prime Pump," says the owner of a large construction company. "Just spot it on the job . . . start the motor and forget your pumping problems. You'll find that these pumps are easy to transport and will operate dependably without care or trouble."

And you don't have any worries about priming or re-priming. That's all handled automatically by the special Rex Recirculating Valve and the only adjustable "Air-Peeler" that literally peels air from the impeller and rushes it out the discharge line. This means that a Rex Pump starts moving water in the fastest possible time.

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When you specify *Rex, you save money!* If you need pumps now or plan on new ones in the future . . . see your Rex Distributor or write for Bulletin No. 443. Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin.

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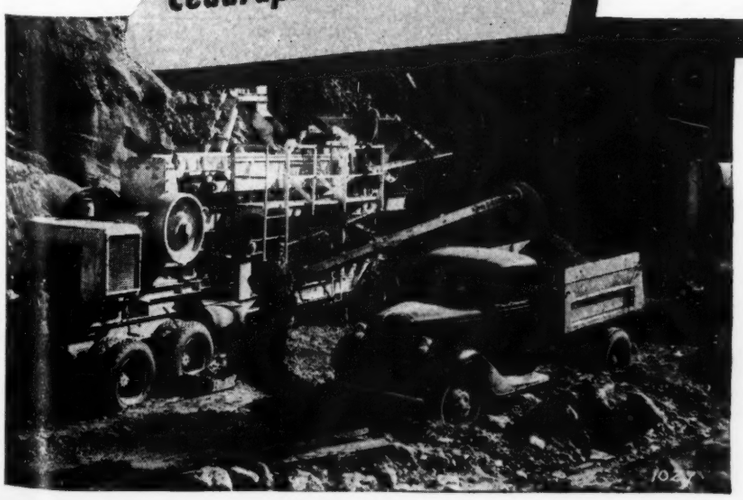
Better country roads will be built because modern machinery can turn out better materials at lower cost, saving money to build many extra miles. The Cedarapids Junior Tandem is a highly portable plant which can be easily moved about to economically produce, *on the job,* the aggregate in the smaller tonnages required for individual country road jobs. Their low first cost, high efficiency, long trouble-free operation and their ability to handle a wide range of jobs mean more miles of better roads at less cost. Your Iowa dealer will be glad to tell you more.

IOWA MANUFACTURING CO.
Cedar Rapids, Iowa

. . . with aggregate from a Cedarapids Junior Tandem



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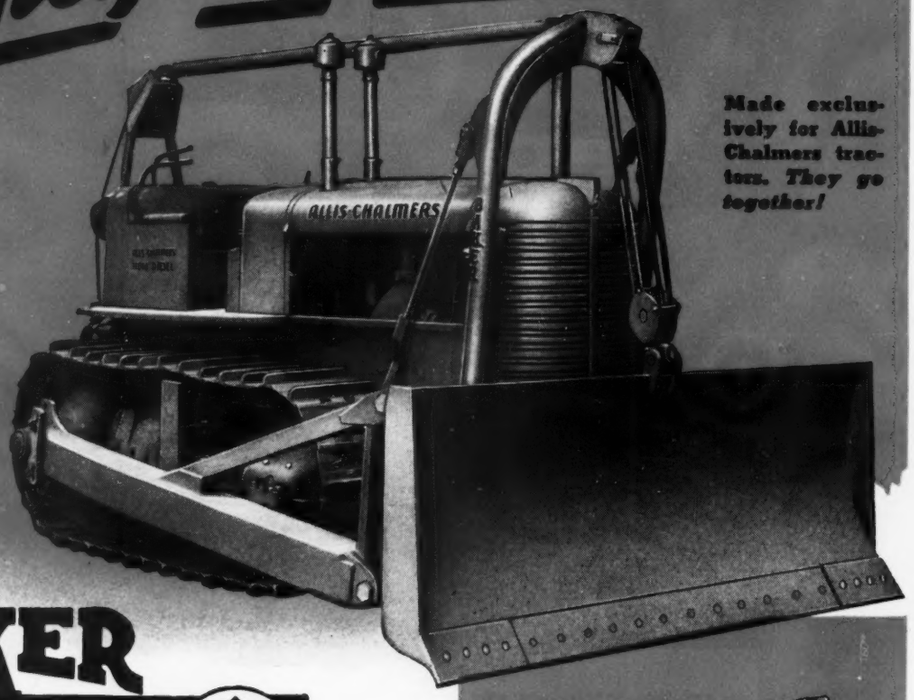
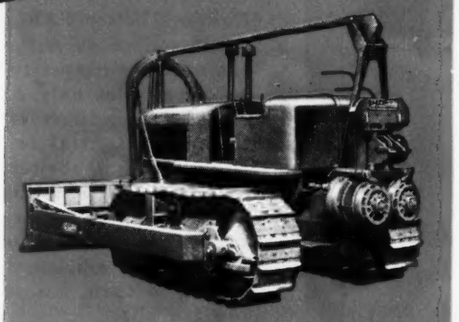
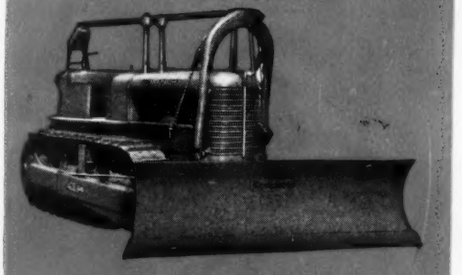


Made exclusively for Allis-Chalmers tractors. They go together!

The New BAKER

Cable Controlled Bulldozer and Gradebuilder and Allis-Chalmers Tractors





Baker, the greatest name in Hydraulic Bulldozers, announces the new Baker Line of Cable Controlled Bulldozers and Gradebuilders. Designed with the full cooperation of Allis-Chalmers and Baker engineers and thoroughly tried and field tested under their joint supervision, here's more evidence that Baker Equipment and Allis-Chalmers Tractors *"go together."*

Features include • 5-position tilting blade on both bulldozers and gradebuilders • "Air-conditioned" cone clutches and differential or self-energizing brakes with all adjustments within easy reach • Rugged tubular steel superstructure • Double and single drum power control units for use on rear, and single drum for use on front power take-off. Available as separate units • Simple to operate and maintain, sturdy construction, well-balanced, minimum weight. Send for literature.

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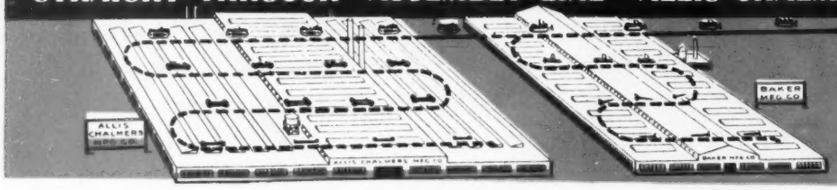
"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

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Texaco Alcaid, Algol or *Ursa Oils* in air compressors, to cite one example, assure wide-opening, tight-shutting valves, free piston rings, open ports, clear lines, continuous air supply. They also assure maximum service life between overhauls, fewer repairs and replacements. Their use in compressors is worldwide.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed below.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

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Made for the Job..

Do not overlook the versatility of a LIMA shovel when buying excavating machinery. There are places and purposes where only a power shovel is the answer to your problem. LIMA shovels are designed to work in wet, muddy ground and tough rock digging as well as dry, loamy dirt. With a LIMA you are prepared to dig earth, rock, coal, ore, clay and many other types of material with assurance of big output regardless of the type of work. In addition to having a fast economical excavator you also have in a LIMA, a material handling crane, pull-shovel or dragline by simply changing front end equipment. When you buy for the future buy an all purpose LIMA and be prepared for any job.

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The severe conditions met during the past three years of war have emphasized again and again the correctness of design and ruggedness of equipment engineered and built by America's machinery manufacturers,—a great majority of whom regularly employ Diamond Roller Chain Drives.

Besides the demonstrated ruggedness, great ultimate strength, ability to withstand long-life operation and shock loads,—Diamond Roller Chains retain substantially their same high efficiency for years and years. And because such chain drives introduce no separating force loading nor belt-type tension strains,—machinery bearings are good for longer trouble-free life.

Users of construction machinery,—as well as designing engineers and manufacturers recognize that Diamond Roller Chain Drives mean greater production with lower maintenance. DIAMOND CHAIN & MFG. CO., 418 Kentucky Avenue, Indianapolis 7, Indiana. Offices and Distributors in All Principal Cities.

DIAMOND ROLLER CHAINS

It will pay you to

COMPARE TOURNAPULL COSTS

WITH YOUR SHOVEL-TRUCK JOB ESTIMATES

It's smart to check your shovel-truck job estimates against what you could do with a Tournapull outfit. Tournapulls will help you get more jobs, finish them faster, and make more money. Here's why.

On most earthmoving jobs Tournapulls lick shovel-trucks because with Tournapulls you have a simpler method. Excavating, hauling, and spreading operations are combined in a single unit. Tournapulls can handle any material suitable for scraper loading including shale, hardpan, etc., which can be broken with a LeTourneau Rooter. You haul most of the cycle in high gear (14.9 mph); off-road, can travel through sand and mud that stop trucks; spread 15-yard heaped loads in evenly controlled layers.

Result — for equivalent yardage output, the Tournapull method requires less investment in equipment, less deadweight of machinery, less horsepower to operate and maintain, less manpower on the job.

TOURNAPULL ADVANTAGES AS HAUL UNIT

1. **With Tournapull, one unit, one operator, haul 15 heaped yards of material each trip.**
2. **It spreads loads in thin controlled layers for better compaction on the fill. No spreader-box needed for gravel surfacing.**
3. **Full weight of Tournapull prime mover — plus 40% of Scraper and its load concentrated on power and steering wheels.**
4. **Big diameter tires (21.00 x 24) make for easier rolling, better flotation, eliminate the problems of duals.**
5. **Long wheelbase (22'), plus big, low pressure tires, provide easy riding for driver and machinery.**

TOURNAPULL ADVANTAGES AS EXCAVATOR

1. **It gets heaping loads as efficiently along a shallow cut and at the same low cost as it does on a deep cut.**
2. **Has greater job flexibility, moves any yard of top dirt any time you want it.**
3. **Eliminates slow and expensive shovel moves from one part of your job to another; also, truck-waiting-at-shovel delays.**
4. **A shovel breakdown ties up the job; a Tournapull breakdown ties up only a single unit, the rest of the fleet goes on working and earning.**
5. **Tournapulls can move job-to-job under their own power, save time and freight costs.**

JOB-PROVED Over 2800 Built and Shipped

TOURNAPULLS

FOR LOWEST NET COST PER YARD

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LE TOURNEAU

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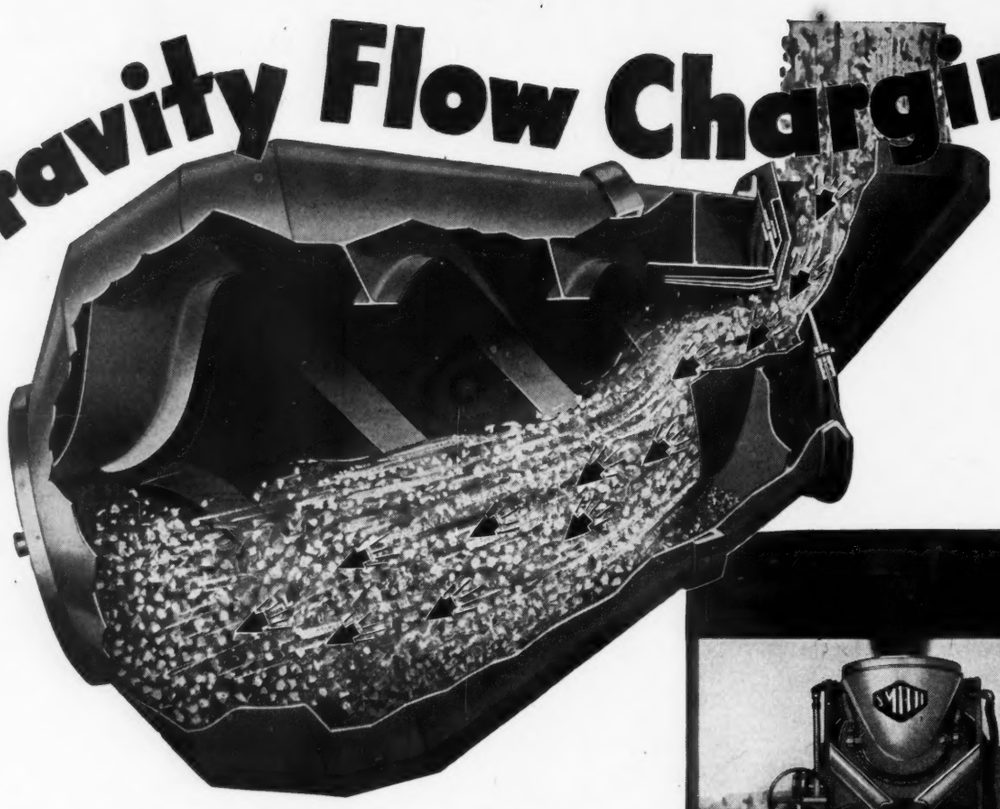
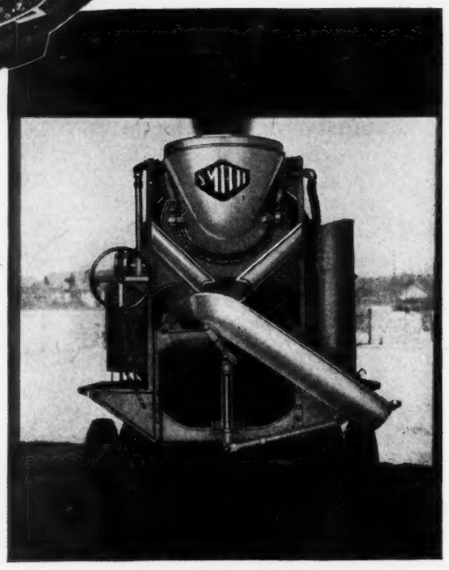
Gravity Flow Charging





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Smith-Mobile's big, roomy feed chute and patented drum construction speeds up truck-mixer charging. The aggregates drop vertically into the chute and continue at high velocity through the charging cone (an exclusive and patented Smith feature) toward the opposite end of the drum. *Gravity does the job!* The action of the mixing blades merely accelerates the flow of the materials. There are no shafts or rods to clog up the feed chute. Smith-Mobile is by far the fastest charging truck mixer on the market.

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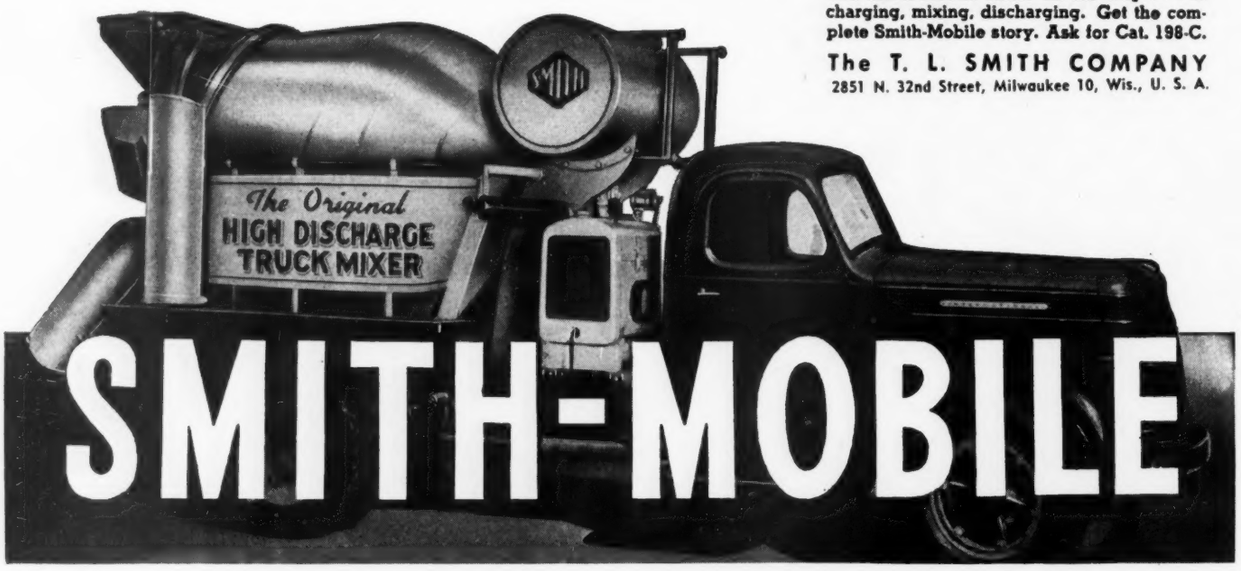

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Service *WHERE* you want it

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Chevrolet's thousands of dealers are pledged to help keep the nation's motor transportation units rolling—and Chevrolet's unmatched parts distribution system makes it possible for them to provide you with the service you want whenever needed. The vast network of Chevrolet service stations, and the factory's great national service and parts departments, are working hand in hand to achieve the same end . . . *the right part at the right place at the right time,* to preserve the vital motor transportation of America.

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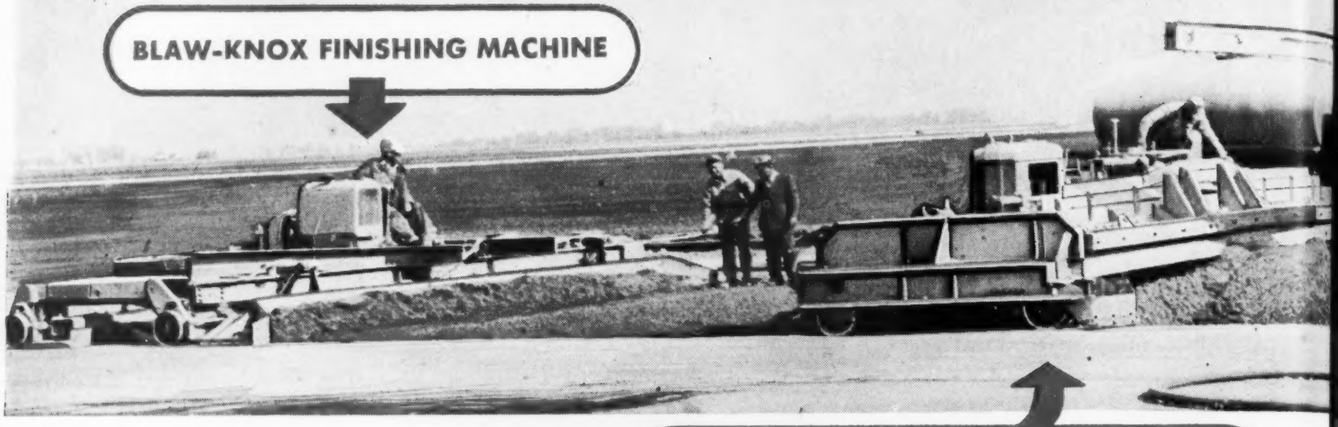
BUY MORE WAR BONDS • HELP SPEED THE VICTORY

25 miles of Concrete



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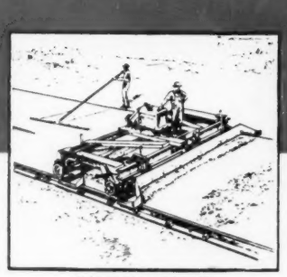
Winnipeg — Kane Tractor & Equip. Co.
Saskatoon — Richardson Road Mach. Co.

NEWFOUNDLAND
St. Johns — Dominion Distributors Co.

An On-the-Job Opinion

"The production record of high-quality concrete slab that we obtained on our University of Illinois airport project was largely made possible through the use of the Blaw-Knox Concrete Paving Spreader and Finishing Machine. These machines operated efficiently and kept pace at all times with the maximum output of concrete from two 34-E Dual Drum Paving Mixers and they aided appreciably in the solution of our man-power problem on this work."

by J. H. Hohnke, Project Manager, Cooke Contracting Co., Detroit, Mich.



FINISHING MACHINES FOR ROADS AND AIRPORTS

PAVING SPREADERS FOR ROADS AND AIRPORTS

The Job— University of Illinois Airport at Champaign, Illinois—a Civil Aeronautic Authority project. Paving 3 main runways, each 150 ft. x 5300 ft. plus taxiways.

The Contractor— Cooke Contracting Company, Detroit, Michigan. J. H. Hohnke, Project Manager.

***The Equipment**— That unequaled paving combination—a Blaw-Knox Automatic Transverse Blade CONCRETE SPREADER . . . and a Blaw-Knox FINISHING MACHINE . . . handling the maximum output of two dual drum 34-E paving mixers.

The Record— 288,000 sq. yds. of 9-in. concrete slab in a 60 (10 hr.) day calendar period, in spite of time lost due to weather, shortage of man-power and materials and equipment change-overs . . . This is equal to 25 miles of road pavement 20 ft. wide . . . Best single day's production (10 hours' work) was equivalent to 3500 linear ft. of road slab 20 ft. wide.

For Speed Plus Quality— Blaw-Knox Has the Paving Equipment for Roads and Airports

Your nearest Blaw-Knox Distributor will handle your inquiries promptly and efficiently.

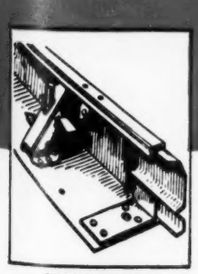
**Vibratory attachments are furnished for Blaw-Knox Pavin Spreaders or Finishing Machines*

BLAW-KNOX

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2086 Farmers Bank Bldg., Pittsburgh, Pa.
NEW YORK • CHICAGO • PHILADELPHIA
BIRMINGHAM • WASHINGTON
Representatives in Principal Cities

ARMY NAVY

7 plants of Blaw-Knox Company have been awarded the Army-Navy "E" for excellence


PAVING FORMS FOR ROADS AND AIRPORTS

STEEL STREET FORMS

CONCRETE BUCKETS

AGGREGATE BATCHING PLANTS

CLAMSHELL BUCKETS

BULK CEMENT PLANTS

WE PUT THE MILKMAN ON OUR PAYROLL

EVERY DAY—at the fatigue point in each shift—every Thermoid employee is served a container of energizing milk. And the workers enjoy a relaxing "seventh inning stretch" as the containers are handed around at machine, bench and desk.

How did we come to put the milkman on our payroll?

One answer is found in the results of his visits . . . the noticeable improvement in the health of both plant and office workers . . . the steady decline in fatigue-born accidents . . . the equally steady, over-all rise in the quality of Thermoid production.

Another important reason, however, was the unique spirit of cooperation that governs all activities here at Thermoid. Long ago, we learned that the sides of the business triangle—the employer, the employee and the customer—are held together by common interests; and retarded functioning of one impairs the useful strength of all.

Thus, the idea of free milk each shift is neither paternalism nor soft persuasion in the minds of Thermoid workers; but is welcomed by them as a common sense way of meeting a mutual problem. And that is the spirit that makes our customers say: "It's Good Business To Do Business With Thermoid."

Thermoid Rubber

DIVISION OF THERMOID COMPANY
TRENTON, NEW JERSEY

THE THERMOID LINE INCLUDES: **TRANSMISSION BELTING • F.H.P. AND MULTIPLE V-BELTS AND DRIVES • CONVEYOR BELTING • ELEVATOR BELTING • WRAPPED AND MOLDED HOSE • SHEET PACKINGS • INDUSTRIAL BRAKE LININGS AND FRICTION PRODUCTS • MOLDED HARD RUBBER AND PLASTIC PRODUCTS.**

IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID

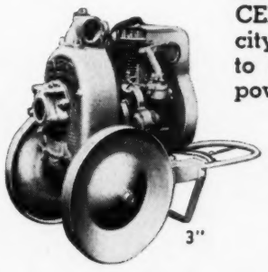
LOOK AHEAD WHEN YOU BUY

Guaranteed performance is *minimum* performance for JAEGER "Sure Prime" PUMPS

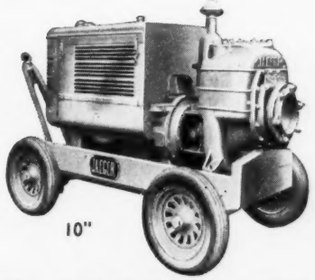
3000 Gallon "Bantam"

Contractors who watch their costs know there's a *big* difference between a Jaeger "Sure Prime" and an ordinary pump of the same size and rating. Jaeger Pumps are built to *exceed* their promises — deliver their rated capacity under tougher conditions, prime unfailingly and up to 5 times faster, assure you of thousands of *extra* hours of dependable cost-cutting service during the post-war building years ahead.

INDIVIDUALLY TESTED AND CERTIFIED for vacuum, capacity and pressure. Sizes 1½" to 10"; gas, electric or diesel power.



3"



10"

JAEGER DISTRIBUTORS in over 100 cities sell, rent and service "Sure Prime" Pumps.

LAYS SMOOTHER PAVEMENTS

the first Bituminous Paver with AUTOMATIC LEVELING, CONTROLLED COMPACTION and FINISH TO SUIT MATERIAL

TRAVELS ON CRAWLERS . . . ON THE SUBGRADE

AUTOMATIC SELF-LEVELING — Besides the "long wheelbase" effect obtained by floating runners with lever-type drawbars which support the screed, the screed is positively held to grade by electrically connected pans, operating on laid surface, curb or header, which correct variations as slight as 15/1000 inch.

UNIFORM COMPACTION — Modern High-Speed Oscillating Compactor crowds and works material into low spots with a uniform pressure impossible with old-fashioned tampers. Cuts off clean.

NO WEIGHT ON THE SOFT SURFACE, TILTABLE SCREED GIVES ANY FINISH — For 14 years Jaeger alone has kept all weight and traction on the subgrade. No premature sealing or displacement of new-laid material. Now, with 2-way tiltable screed, finish can be varied from the most open, fluffy surface to the densest sheet asphalt. Ask for Specification BPL-4. It gives full details.

JAEGER SPREADER-FINISHER "TEAM" for Concrete Airports, Highways

Proved by More Thousands of Miles!

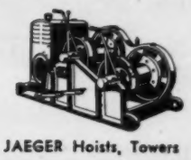
THE JAEGER MACHINE COMPANY

800 Dublin Avenue, Columbus 16, Ohio — Distributors in 120 Cities

"SPEEDLINE" Mixers

"AIR PLUS" Compressors

"FLEETFOOT" Loaders



JAEGER Hoists, Towers

"DUAL MIX" Truck Mixers

NEW TIME-SA

Highest Quality Lubricants – Engineering aid...Tested maintenance schedules, and many other time-savers now combined into ONE COMPLETE SERVICE for Contractors!

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates:
Magnolia Petroleum Co., General Petroleum Corp. of Calif.

THIS co
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SAVING TEAM

THIS complete lubrication service is made to order for the contractor swamped with jobs marked "RUSH." Here's how it helps you meet and beat urgent deadlines.

Whether you use 7 or 70 different types of machines, you get exactly the right oils and greases for *all* applications—even the most unusual ones. No more time wasted on special orders, follow-ups and extra bookkeeping.

Wherever your operations take you, we *schedule regular deliveries right on the job.* This helps you reduce inventory problems—minimizes out-of-service time for equipment—saves manhours.

The Socony-Vacuum Representative is always ready to cooperate with your men—to help educate "green" hands on where, when and how to lubricate each machine. He also brings you field-proved maintenance schedules—practical help with any "problem" equipment—and qualified engineering aid when needed.

Why be satisfied with fuels and lubricants, alone, when you can get complete contractor's service by specifying Socony-Vacuum products.

"ON YOUR STAFF—BUT NOT ON YOUR PAYROLL"
Your Socony-Vacuum Representative

CORRECT LUBRICATION FOR EVERY PART OF EVERY MACHINE YOU OPERATE . . .
PLUS
1 ENGINEERING HELP on time-losing operating problems; 2 TESTED MAINTENANCE SCHEDULES that minimize service man-hours—keep equipment on the job; 3 PROMPT, DEPENDABLE DELIVERY—a reliable, on-the-job service that eliminates inventory problems for you!

TUNE IN "INFORMATION PLEASE"—MONDAY EVENINGS, 9:30 E.W.T.—NBC

SMOOTH AS OIL!

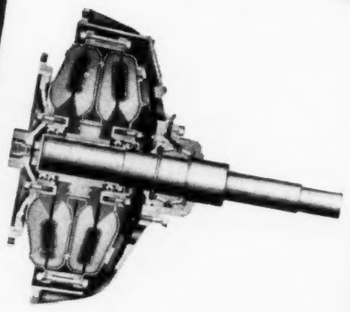
No shock—no stall—no loafing—with FLUID-DRIVE LORAIN 82!

YOU can tackle a mountain of rock—or any other tough job—with a Lorain 82 and get the most out of every work-minute! These husky shovels are equipped with a life-saving, shock-absorbing hydraulic coupling that smooths out heaviest digging shocks and keeps the engine pulling at peak power under toughest loads. You just can't stall the engine!

No matter how big the rock or how tight it's lodged, the Lorain 82 hangs on until it's in the dipper. Sudden jerks, impacts and other shocks are cushioned by the spinning oil clutch—eliminating stress and strain on mechanism and cables and greatly lessening operator fatigue.

Combine this life-prolonging feature with Lorain center-drive direct-to-the-point power application, two-speed chain drive crawler, all-steel all-welded boom, all-steel dipper stick and new, streamlined dipper and you've got the ideal rock shovel—the Lorain 82!

If you want shovel performance that's literally "smooth as oil" and new, low per-yard handling costs, write for complete data on the shockproofed shovel.



Power for the Lorain 82 flows through this hydraulic coupling. Shocks impacts and sudden strains on the mechanism and cables are cushioned and absorbed by the fluid connection.

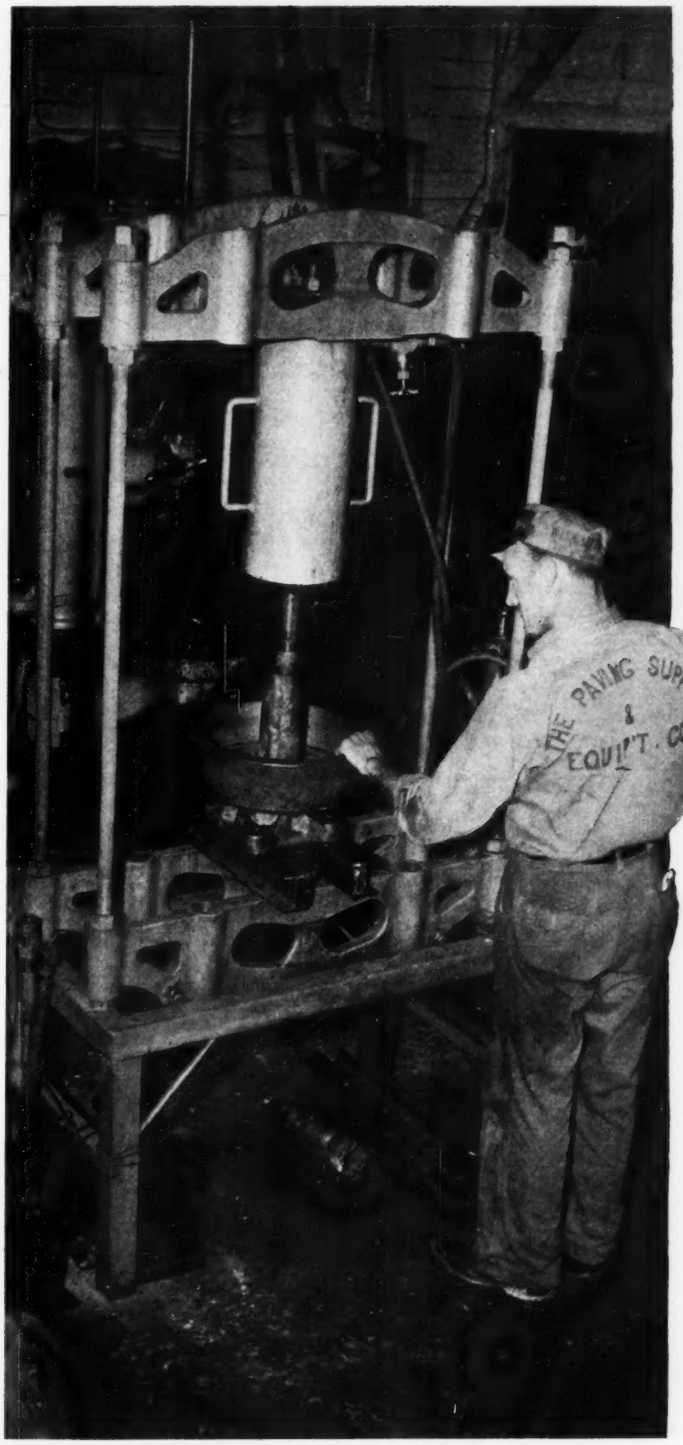
Reg. Trade Mark

thew-Lorain

THE THEW SHOVEL CO.
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

NO. 25 OF A "READY-WITH-A-RODGERS" SERIES



Pressing a shaft into a drum—The Paving Supply and Equipment Company, Washington, D. C.

"Our Rodgers Universal is always busy"

"Our Rodgers Universal Press services all kinds of heavy machinery. We use it for pulling gears, pushing out bushings, straightening shafts — wherever portable power comes in handy. It takes these jobs as they come—and they come often. A shop like ours would be hamstrung without the Rodgers."

This observation, and the photograph, came to us from Mr. A. Hovey-King, The Paving Supply and Equipment Company, Washington, D.C. It is typical of experiences reported to us by other Rodgers users. The Rodgers Universal Press supplies portable pressing, pulling, and lifting power—saves shop time, simplifies operations. Put it to work for *you.* For more detailed information and prices, write or wire Rodgers Hydraulic, Inc., 7403 Walker Street, St. Louis Park, Minneapolis 16, Minnesota.

If It's a Rodgers It's the Best in Hydraulics

Uses for the RODGERS UNIVERSAL HYDRAULIC PRESS

Pulling Gears, Sprockets, Pulleys, Couplings, Sheaves, Drums • Wheel Press Work
Jacking Pipe • Erecting Machinery
Relocating Machinery • All-Purpose Jack

RODGERS HYDRAULIC, Inc.

Long Life Liners for Streamliners

Sleek, powerful and modern are the Streamliners as they go streaking through the country on fast schedules and with heavy loads. Their rugged Diesel engines take terrific punishment and take it ably.

Yet there is a spot in these sturdy engines that is vulnerable to wear . . . the cylinder liners. Or rather, the liners are vulnerable to wear *unless they are long life liners treated with* PORUS-KROME . . . as many Diesel engine liners are.

That is why one large manufacturer of Diesel engines for Streamliners and other applications has standardized on PORUS-KROME liners for all engines coming off the production line. And that is why other engine manufacturers are planning to use PORUS-KROME in their engines as soon as they can again build engines for civilian use. It enables them to offer their customers engines of greater reliability and longer life . . . and lower maintenance costs.

And what is PORUS-KROME?

PORUS-KROME is hard, pure chromium which is applied to cylinder bores by the patented Van der Horst process. It has tiny pores and channels in its surface which serve as reservoirs for lubricating oil, feeding it back to the surface as needed. It reduces corrosion and wear and multiplies cylinder life 4 to 20 times, and ring life 3 to 4 times.

Be sure the engines you buy have the greater reliability and lower maintenance costs which are assured by PORUS-KROME. Write today for detailed description of PORUS-KROME and its advantages in gasoline and Diesel engines which are given hard use in commercial and industrial service.

PORUS - KROME

Good for the Life of your Engines

VAN DER HORST

U.S. PATENTS 2,048,578 AND 2,314,604

VAN DER HORST CORPORATION OF AMERICA OLEAN • NEW YORK CLEVELAND 11 • OHIO

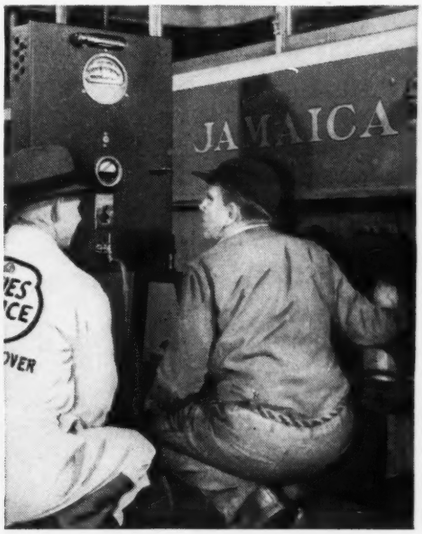
AN AFFILIATE OF DRESSER INDUSTRIES

POWER PROVER helps save 250 to 315 gallons of gasolene a day in this fleet

Jamaica Buses, Inc., at 114-02 New York Blvd., Jamaica, L. I., operates 73 buses, serving Jamaica, Queens and Nassau.

"My fleet runs right . . . and I can prove it *scientifically* with the Cities Service POWER PROVER," says J. F. Weidner, General Maintenance Superintendent of Jamaica Buses, Inc. "It *eliminates* guesswork in tune-up. Tells *quickly* and *accurately* just *what* and *where* the trouble is. As a result we get better bus operation . . . less oil dilution . . . and save several hundred gallons of our strictly limited supply of gasolene every day."

Proof No. 1: After inserting hose of Cities Service Power Prover in exhaust outlet, Bill Rees, Power Prover Serviceman, points out a *42% gasolene waste* to Bill Koestring, mechanic for Jamaica Buses, Inc.



Proof No. 2: Bill Koestring makes his tune-up adjustments as he watches the Power Prover dial. Accurately, quickly, the needle registers a gradual reduction in gasolene waste, as tune-up progresses.

Proof No. 3: Bill Koestring shows George Kletty, Garage Foreman for Jamaica Buses, Inc., just how he improved engine efficiency ...and reduced gasolene waste from *42% to 18%—normal idling operation.*

Take Advantage of the Cities Service Power Prover for Your Own Fleet — NOW!

Mail in This Coupon *Today* for a *Free* Demonstration Test on Your Vehicles.

This offer is limited to principal cities in Cities Service marketing territories East of the Rockies.

CITIES SERVICE OILS
ONCE-ALWAYS

Cities Service Oil Company,
Room 268
70 Pine Street, New York 5, N. Y.

Gentlemen: I am interested in your offer of a FREE Demonstration Test of the Cities Service Power Prover on my fleet . . . *without obligation to me.*

Name.....

Address.....

No. of Vehicles in Fleet.....

Fully equipped with Goodyear Sure-Grips, this Austin Western Grader speeds a road-building job.

More grip, faster work with O·P·E·N C·E·N·T·E·R traction

ON shifty soils like mud, clay and sand, Goodyear's great Sure-Grip has more grip, slips far less, gets work done faster.

That's because its time-proved *open center* tread leaves those husky lug bars open at *both* ends—permits them to bite cleaner, sharper—provides maximum traction under all conditions.

And with no holding pockets to clog up with mud, this self-cleaning *open center* tread won't spin helplessly when the going gets tough. Those wide, unblocked channels sluice out dirt, mud and stones, leaving the massive lugs free and clear to bite deep and pull better in any kind of ground.

All this, combined with Goodyear's multiple-compounded construction and the extra strength of Goodyear's low stretch Supertwist cord carcass, makes these tires the finest graders that can be built from today's synthetic and permissible natural rubber. That's why more and more contractors now buy Goodyear Sure-Grips for their power wheels.

Put Goodyears to work on your equipment and you will soon know why "more tons are hauled on Goodyear truck tires than on any other kind."

THE RIGHT TIRE FOR EVERY JOB

ALL-WEATHER EARTH-MOVER for drawn vehicles | **HARD ROCK LUG** for all rock work | **SURE-GRIP** for drive wheels } **PRODUCTS OF GOODYEAR RESEARCH**

Sure-Grip, Supertwist, All-Weather—T.M.'s The Goodyear T. & R. Co.

GOODYEAR

THE GREATEST NAME IN RUBBER

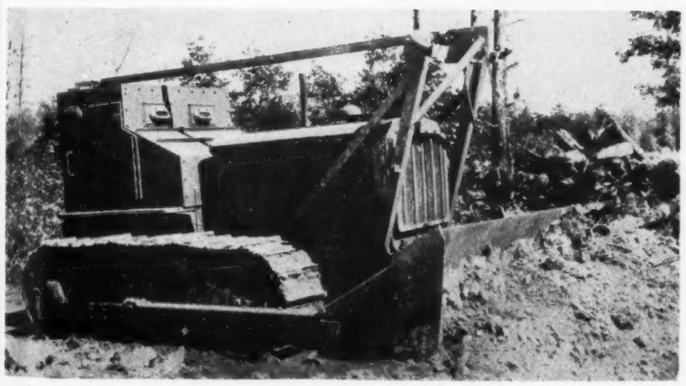
Construction Methods

ROBERT K. TOMLIN, Editor

Volume 27 — APRIL, 1945 — Number 4

New Engineer Equipment Adds Strength to American Arms

PUSHING POWER PLUS FIREPOWER of tankdozer enables Sherman medium tank, equipped with hydraulically operated bulldozer blade, to reduce bunkers and pillboxes, overcome obstacles and perform all earthmoving services in manner comparable to heavy tractor-dozer. Bulldozer blade assembly can be jettisoned in 10 sec. by control from inside tank to free fighting vehicle for combat.



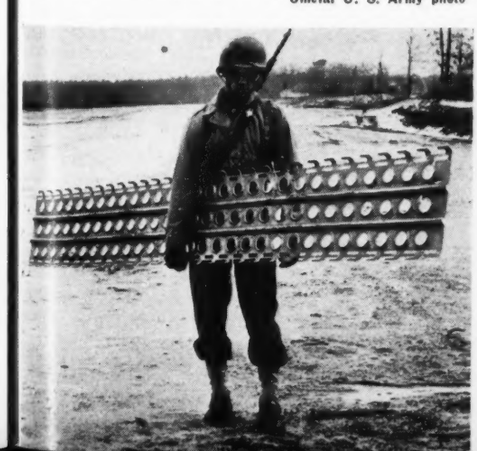
ARMORED CAB, assembled in field from ½-in. fabricated plates which come with nuts already welded in place at inside of bolt holes, protects tractor-bulldozer operator from small arms and machine gun fire, land mines, hand grenades, and bomb and shell fragments. Later design includes vision blocks (periscopes), instead of ports and slits, to provide unhampered vision when cab is buttoned up under fire. Fans help to cool cab in hot climates.

EQUIPMENT DEVELOPED BY THE CORPS OF ENGINEERS, U. S. Army, and its Engineer Board, Fort Belvoir, Va., is supporting and speeding the advance of American forces in all theaters of war. Added punch and protection for indispensable bulldozer operations have been provided by mounting bulldozer attachments on Sherman M4 medium tanks, and by inclosing the operators of tractor-bulldozers in ½-in. armor plate cabs, shipped knocked down for field assembly.

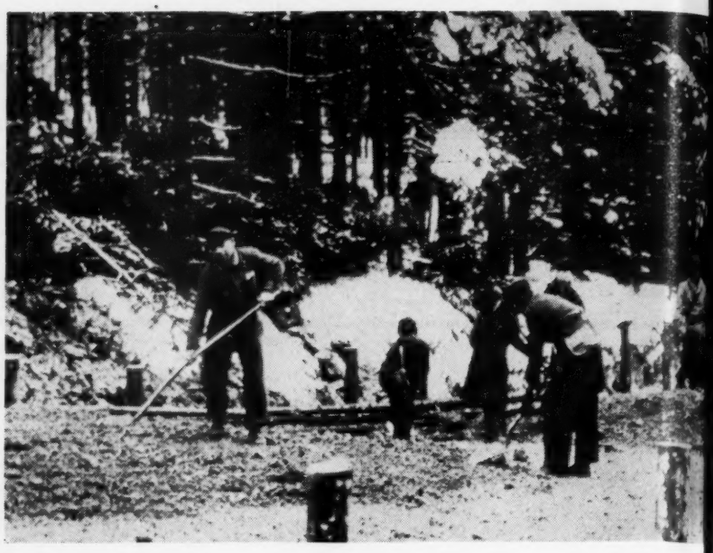
For rapid crossing of water obstacles, treadway bridges capable of passing 250 medium tanks an hour over rivers flowing up to 5 mph. are constructed of pin-connected 12-ft. treadway units, 45½ in. wide, formed of steel channels and open grid flooring, locked to steel saddles on pneumatic pontons or sup-

(Continued on page 146)

ALUMINUM ALLOY MAT (below) for temporary air strips consists of pierced panels about 10x1¼ ft. weighing 31.8 lb. each, less than half as much as steel, to lighten load for air transportation.
Official U. S. Army photo



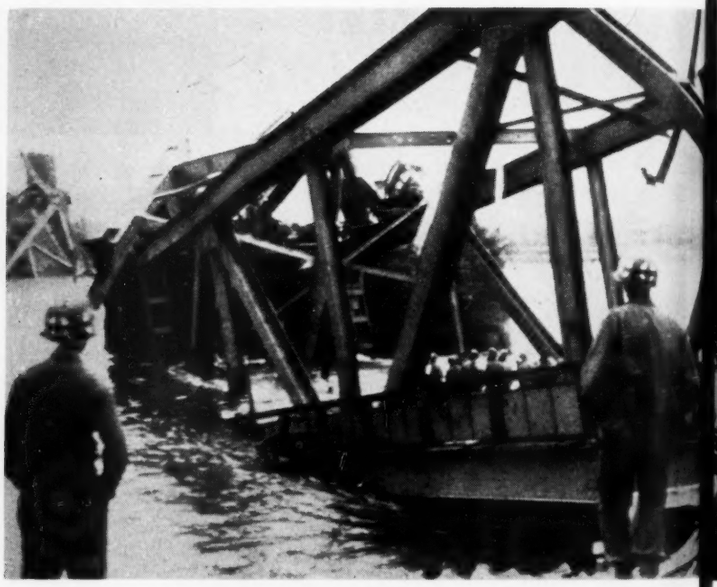
STEEL TREADWAY BRIDGE (below) of pin-connected treadway units locked to steel saddles on rubberized canvas tube pontons spaced 12 ft. c. to c. carries tank destroyer across Moselle River in France. This M2 type of bridge takes vehicle loads up to 45 tons.
Signal Corps Photo



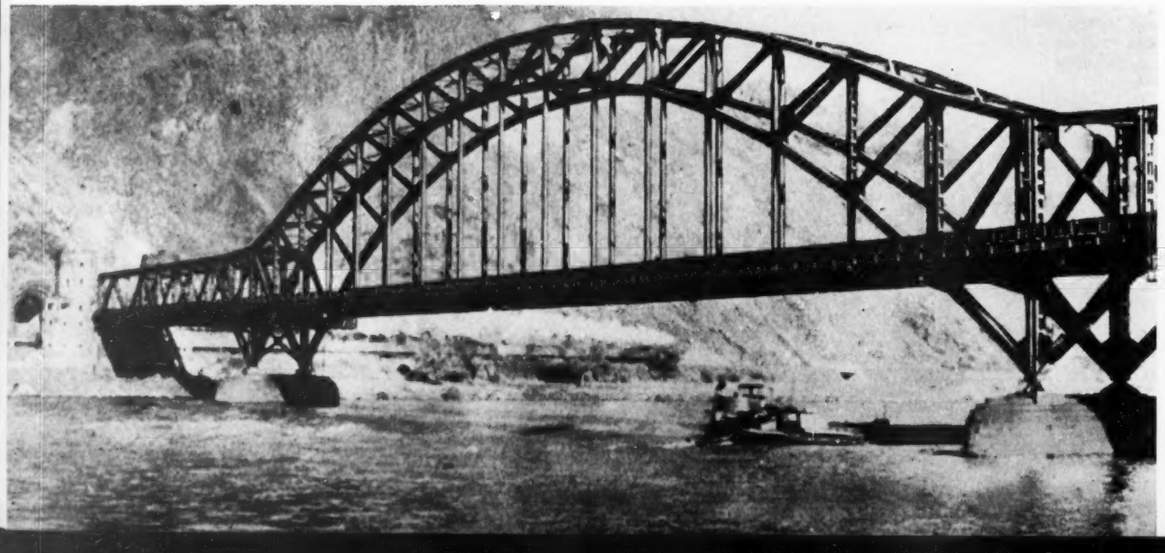
CONSTRUCTION EQUIPMENT performs wide range of services for Army overseas. Here barrel of 8-in. rifle is swung over its carriage by truck-mounted Lorain crane operated by American troops in France.

Signal Corps Photo

THIS MONTH'S NEWS REEL



REMAGEN RAILROAD BRIDGE in Germany, first span to carry U. S. troops across Rhine, collapsed March 17, 10 days after capture by First Army. About 200 Engineers were working on bridge when it fell. Below, left, is bridge before collapse, which is attributed to German demolition charges, indirect artillery hits and strain of carrying continuous stream of U. S. equipment. Bridge is double-track structure with total length of 1,068 ft. between abutments, principal span being 512-ft. tied arch. Side spans are 278 ft. long. Press Association Photos

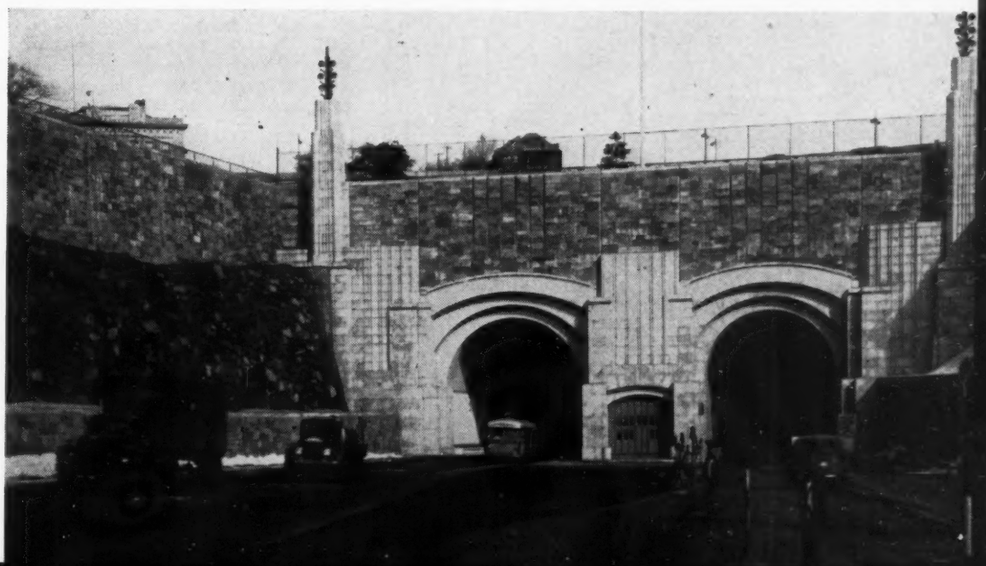


GERMAN CIVILIANS do road repair work in Germany under supervision of American Army Engineers. Conscripted from Stolberg by military government authorities, 85 Germans work on this project for 8 hr. a day at 6c. an hour.
Press Association Photo

ON SHASTA DAM CREST crews place concrete for highway over spillway. Dam and power plant are now 95 percent complete, with spillway drum gates, electric generating units, elevators and other metal equipment still to be installed. World's second largest and second highest dam and California's largest power plant, Shasta is 602 ft. high, with crest length of 3,500 ft. Into it were poured more than 6,532,000 cu. yd. of concrete.
U. S. Bureau of Reclamation Photo

LEDO-BURMA ROAD OPENING is attended by Opera Singer LILY PONS, who stands behind ribbon at China-Burma border just before it was cut to allow first motor convoy to proceed from India to China. With Miss Pons is her husband, Orchestra Leader ANDRE KOSTELANETZ (left) and BRIG. GEN. LEWIS A. PICK (right), commander and chief engineer of Ledo Road project. (Construction of road is described elsewhere in this issue.)
Press Association Photo

NORTHERN PACIFIC TUNNEL on mountain pass between Bozeman and Livingston, Mont., is holed through by J. C. Boespflug Construction Co., of Seattle, Wash., general contractor. When completed, tunnel will be 18 ft. wide, 24 ft. high and 3,015 ft. long, with 600-ft. open cut on west end. Concrete lining, now being poured, will be 2 ft. thick over timbered area and 18 in. elsewhere.

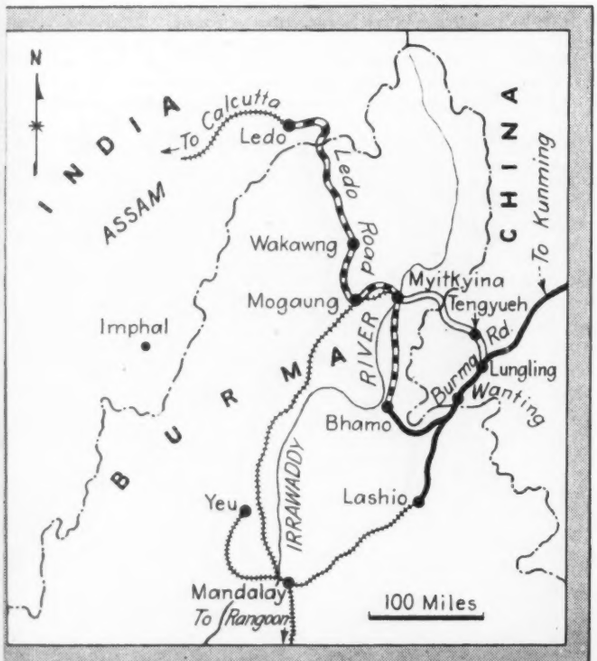


NORTH TUBE OF LINCOLN TUNNEL (right) is now open for one-way westbound traffic under Hudson River, connecting midtown Manhattan with Weehawken, N. J. With Feb. 1 opening of north tube, south tube became two-lane one-way eastbound roadway. Each tube is 31 ft. in external diameter and carries two-lane 21-ft. 6-in. roadway. North tube is 7,482 ft. long and south tube 8,217 ft. Each has 4,600-ft. under-river section. Tunnel was built and is owned and operated by Port of New York Authority. Contractor was Mason & Hanger Co., Inc.

Burma-Ledo Road

Built Through Jungle and Over Himalayan "Hump" to Carry War Supplies Into China

CHINESE LABORERS swing picks in every available inch of space to speed reopening of Burma Road, under supervision of American Engineers.



BUILDER OF "PICK'S PIKE" is Brig. Gen. LEWIS A. PICK (right), who came to Ledo Road from Omaha, Neb., where he directed more than billion dollars' worth of Army construction as division engineer of Missouri River division, Corps of Engineers. To men working with him on road he is known as "man with the stick" because of his famous cane, a long rattan stick with hooked end for handle, handy for catching on to branches and pulling up slopes.

Signal Corps Photos

STILWELL ROAD (left) carries war supplies from India to China through jungles and mountains of Burma.

Page 58

ELEPHANTS

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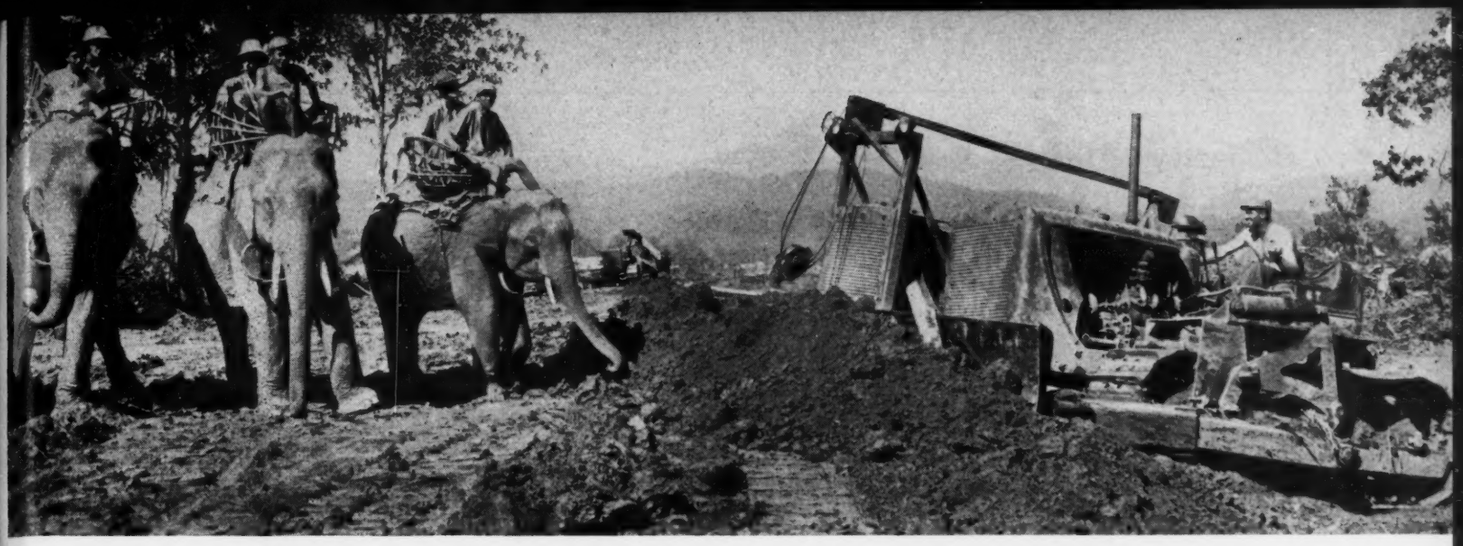
HEAVY TIMBE



ELEPHANTS carry survey party past site where tractor equipped with LaPlant-Choate bulldozer is grading Ledo Road.

From information supplied by Y-Force Operations Staff, U. S. Army Forces, China-Burma-India

FIRST CONVOY of American war supplies for China rolled across the Burma border into Yunnan Province, in southwest China, on Jan. 28, culminating work on the Burma Road which had been closed since early 1942. This overland supply route, renamed Stilwell Road in honor of General Joseph W. Stilwell, includes the recently completed Ledo Road, the newly rebuilt Burma Road and a new cutoff between them.

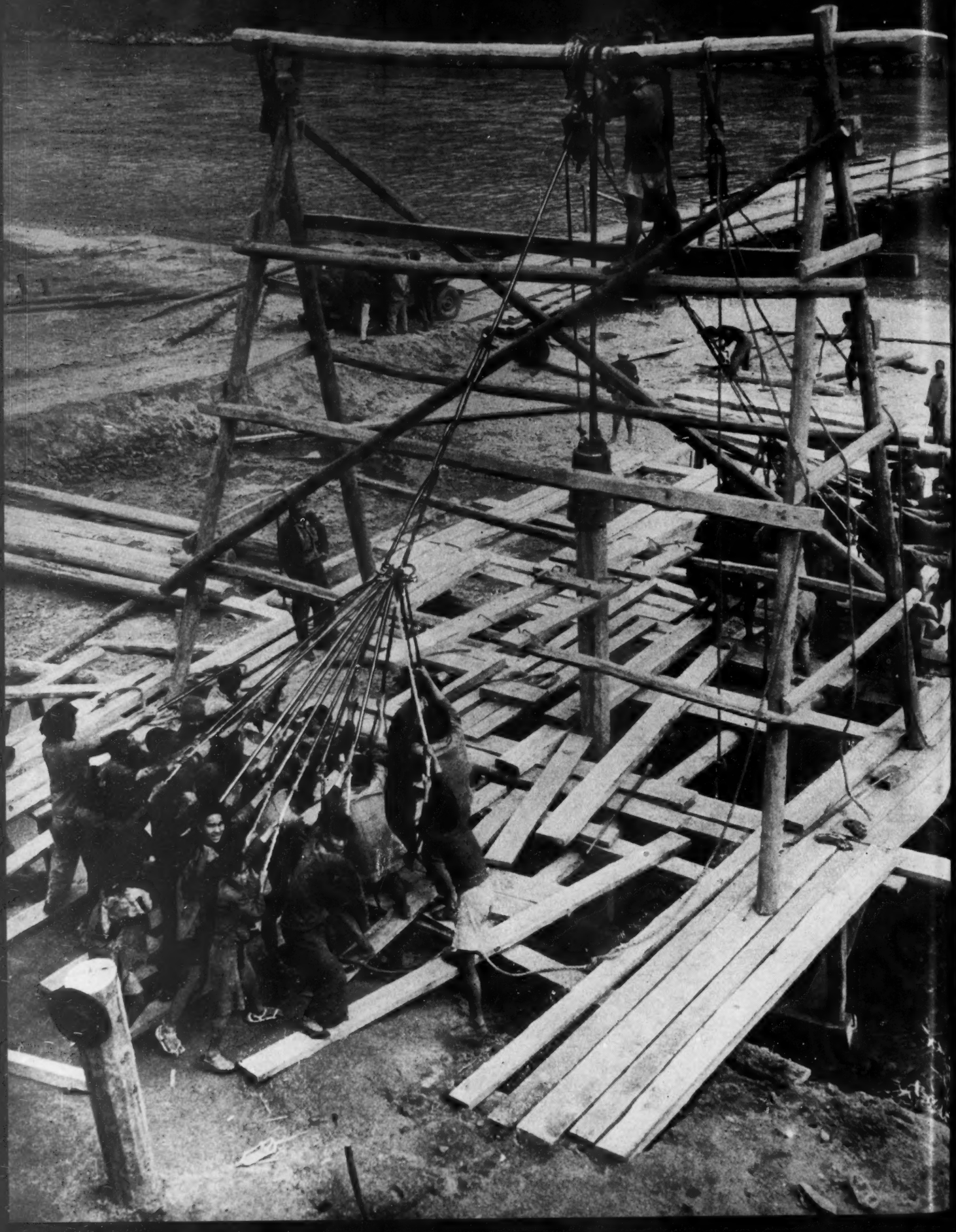
The Ledo Road portion, unofficially known as "Pick's Pike" for Brig. Gen. Lewis A. Pick who took command of construction in October, 1943, represents a major milestone in U. S. Army Engineer history. In 15 months the road was pushed from the 45-mi. mark to a junction with the Burma Road about 400 mi. away. This represents progress of about a mile a day over a route that passes through 102 mi. of mountains and over two 4,000-ft. passes. Through the mountains 100,000 cu. yd. of earth was moved for each mile of road constructed. In all, about 13,500,000 cu. yd. of earth was moved. Practically every foot of the road had to be cut through a dense jungle and for six months out of a year the work had to be carried on during an almost unceasing downpour that totaled more than 150 in. during the monsoon season.

The new route crosses 10 major rivers and 155 secondary streams. There is a bridge crossing for every 3 mi. of road. If the culvert pipe used in the drainage system were placed end to end it would form a continuous conduit 105 mi. long. The route over much of its length had to be discovered by aerial reconnaissance and engineering instinct—the Japanese

NATIVE LISU WOMEN (right), bedecked with rings, necklaces and ornaments, come from hills in southwest China to work on Burma Road.

HEAVY TIMBER (below) is carried by natives, by means of poles slung across their shoulders, to approach to Tisung River bridge on Burma Road.

PRIMITIVE PILEDRIVER is manually operated from bolted headframe by Chinese coolies repairing bridge over vital river crossing on way to front.



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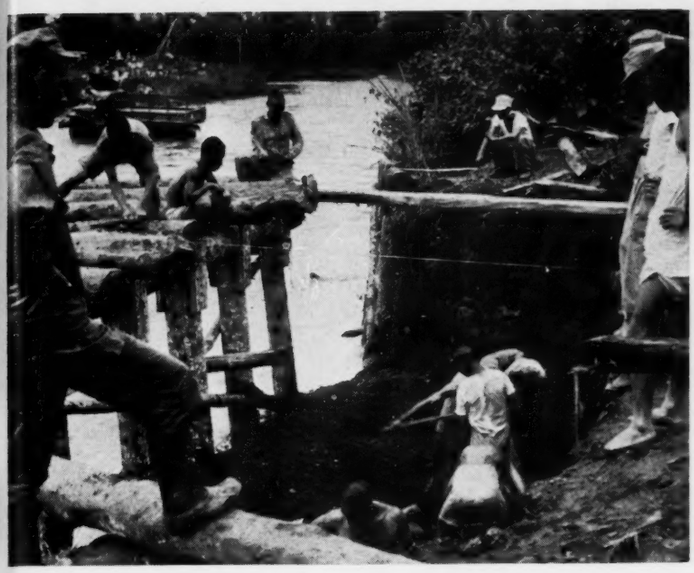
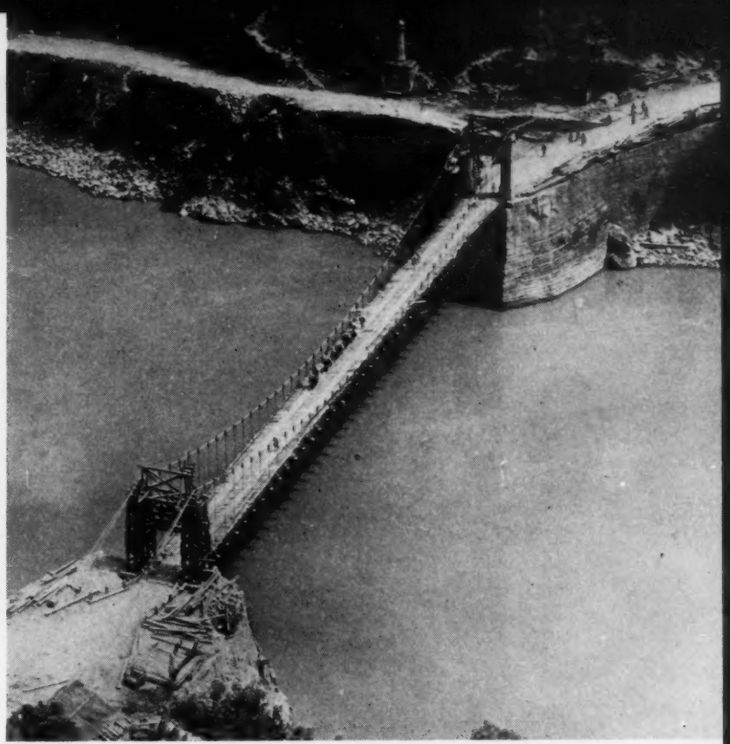


BRIDGE WASHOUT is repaired by Chinese engineers on Burma Road.



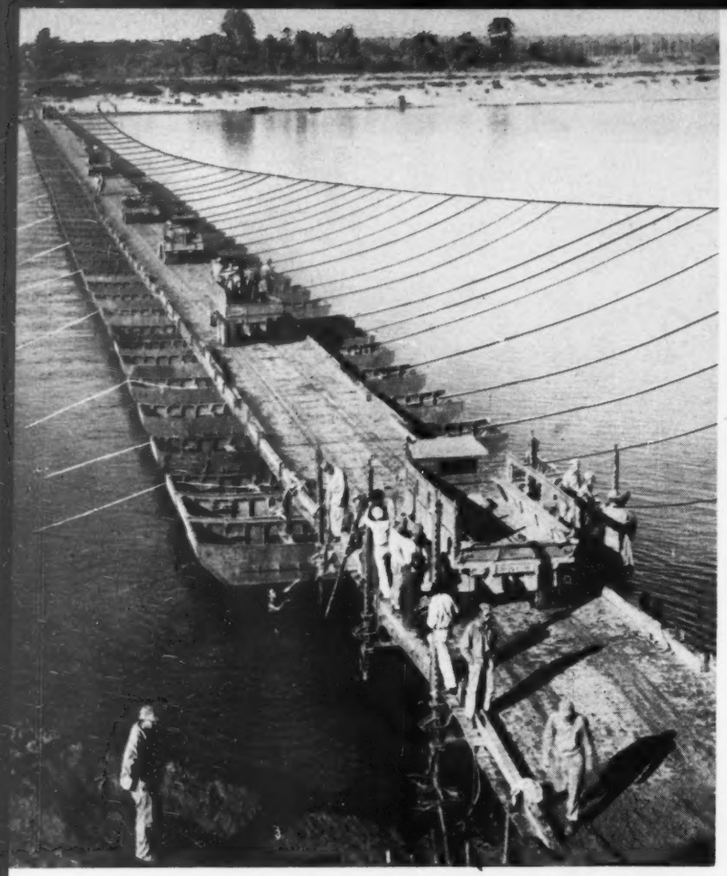
CABLE SUSPENSION BRIDGE (right) carries Burma Road over Salween River.

were always just ahead of the lead bulldozer and it was not possible to send out survey parties to select the route in advance. Many unprecedented problems had to be solved, such as floating bridges to span rivers that rise 45 ft. in a few days of monsoon rains and draining underground springs that broke out under the roadbed.

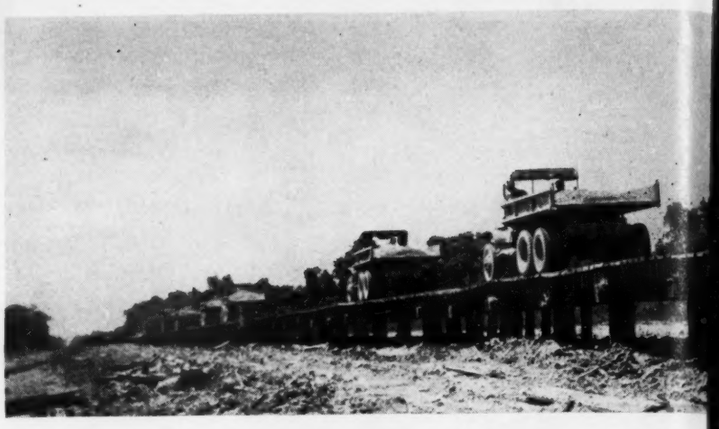
The Ledo Road leaves the railhead of the Assam State Railways at Ledo, India, crosses the Pagoda and Punkin mountain ranges and follows the Hukawng, Mogaung and Irrawaddy valleys to Myitkyina. It then runs south to the river port of Bhamo, where it meets the northern leg of the Burma Road, leading to Kunming, China. The new shortcut across the mountains from Myitkyina to the

PLANKS FOR BRIDGE are laid and nailed by native laborers under supervision of LIEUT. QUAN Y. CHING, of Honolulu, Burma Road Engineer.

PONTON BRIDGE (below) is constructed across Nam Yung River. It required only 8 min. to lay boards on runway once floating supports for structure were moored in place.



LONGEST PONTON BRIDGE (left) of this war is title claimed for 1,200-ft. span across Irrawaddy River. It was constructed by 60 men in 14 hr., 45 min.



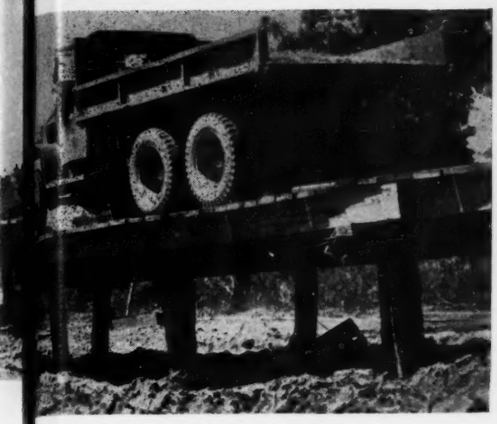
GRAVEL TRUCKS roll over Ledo Road causeway, which ranges up to heights as great as 9 ft.

CAP IS LOWERED into place on pilings by Quickway crane. Engineer soldiers are building 10,000-ft. causeway on Ledo Road to overcome washing out of road at this point due to heavy rains and lack of drainage.

ROCKS ARE CLEARED from Burma Road by Caterpillar tractor with LeTourneau angledozer furnished by Y-Force Operations Staff and operating along Salween River behind advancing Chinese troops.

TRANSIT AND ROD (below) are used to determine exact height at which piling for Ledo Road causeway should be cut off.

AMERICAN ENGINEER-SOLDIER (below) shows Chinese handyboy how to operate bulldozer.



Burma Road by way of Tengyueh and Lungling saves almost 100 mi. over the route by way of Bhamo.

The Burma Road was rebuilt by China's Yunnan-Burma Highway Engineering Administration, advised and assisted by a small hand-picked group of Americans, now called Burma Road Engineers, under the command of Col. Louis Y. Dawson, Jr., U. S. Army Corps of Engineers. The Chinese furnished engineers, up to 30,000 coolies at a time and supplies and material. Most of the work was done by hand labor, with the Chinese literally scratching out the road, using their hands, the "tzow tau" (mattock-like shovel) and the bamboo basket. Only eight pieces of patched-up road equipment were available, including three D4 Caterpillar bulldozers, one No. 112 Caterpillar motor patrol, one ⅜-yd. Rustin-Bucyrus power shovel, two German air compressors and one Ingersoll-Rand air compressor. For six months this equipment worked 20 percent of the time and 80 percent of the time was inactive because of lack of repairs or parts. Gradually spare parts be-

TRUCKS, AMBULANCES AND JEEPS assemble at Ledo, Assam, to form first truck convoy in 2½ years to carry supplies to China. Many vehicles pull anti-tank guns and field artillery pieces for Chinese Army. Destination is Kunming, China.

GASOLINE POWER SAW (below) cuts trees at Engineer Depot in India. Logs will be cut into lumber for use on Ledo Road.

CORDUROY ROAD (below) leading from Tinhawk to causeway is graded. Speed limit on this 10-mi. stretch is 5 mph.

CHINESE COOLIES scratch road out of Kwan Hsi Po mountain. Moving earth by handfuls and one rock at a time, they prepare way for Burma Road Engineers to move in with American equipment and widen narrow stretches.

DISASSEMBLED PARTS of American jeep are carried over mountain in China for reassembly on Burma Road. Press Association Photo

AIRBORNE PARTS (right), including engine and radiator of Caterpillar bulldozer are unloaded at airfield on China - Burma fighting front. Equipment is disassembled in rear areas and flown to advance fields to be quickly reassembled for work.

TWENTY-FOUR SWITCHBACKS (below) are feature of sinuous section of Burma Road crossing mountainous terrain in China.

CULVERT PIPE (below) used in drainage system of Stilwell Road would, if placed end to end, form continuous conduit 105 mi. long. Serious maintenance problem is created by monsoon rains which wash out fills and cause slides.

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AIR COMPRESSORS AND DRILLS are operated by Chinese workers directed by Burma Road Engineer.

came obtainable and the Chinese and Americans became more efficient in improvising repairs. Explosives in possession of the Chinese were several-year-old German black powder without fuses or detonators.

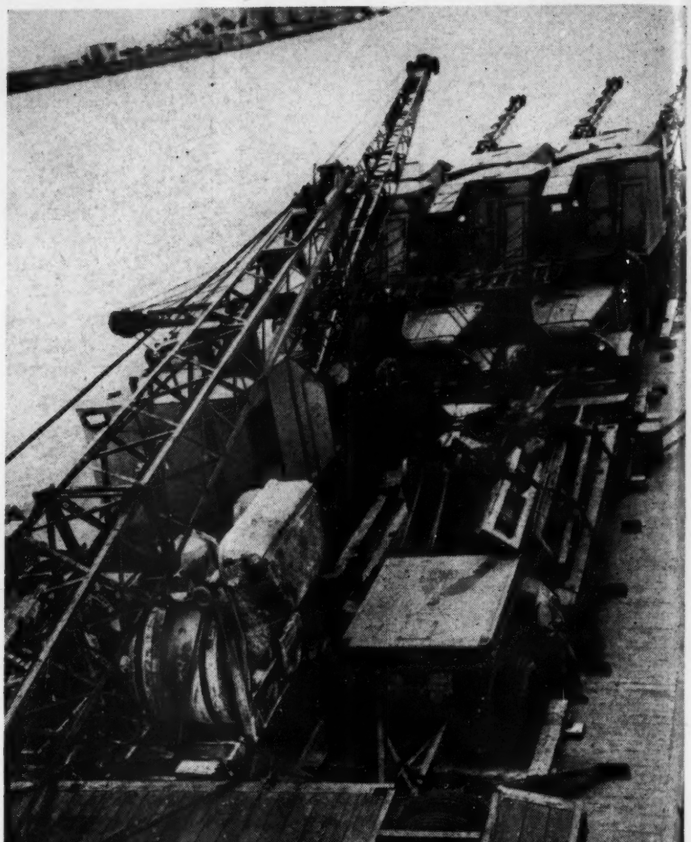
Regarding maintenance possibilities, Colonel Dawson believes that a Burma Road force of 24 road patrols, 12 bulldozers and 12 air compressors properly operated could reduce the road-traveling vehicle maintenance costs 50 percent and reduce the vehicle fuel requirements 20 percent below the costs as of August, 1944. As a military supply road from Kunming and as a combat road in the Salween area, it has already withstood monsoon rains and slides have not put it out of operation longer than a few hours.

ROCK CRUSHER of 7-cu. ft. capacity is operated on Ledo Road.

GRAVEL IS DREDGED (below) from river in Burma by Quickway crane equipped with dragline bucket.

ROAD-BUILDING EQUIPMENT (below) is assembled by Burma Road Engineers at forward airstrip in southwest China after having been flown over Himalaya "Hump" from India.

FINAL CONNECTION with ship to shore pipeline distribution system for petroleum products on west side of Cherbourg harbor is made by Engineers.
Wide World Photo



BIG BARGE, loaded with cranes, trucks and concrete mixers for repair of port, enters Cherbourg harbor.
Signal Corps Photo

Port of Cherbourg

Restored by Allied Engineers With Equipment Brought From England Or Left by Germans

AMERICAN FREIGHT CAR slides on to French railroad track from LST moored at beach in harbor. Navy Seabees and Army Engineers worked together to produce railway landing ramp that joins land track with LST track continuously, despite rise and fall of boat.
U. S. Navy Photo

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BRITISH ROYAL NAVY DIVER (above) is ready to begin descent into mine-laden waters of harbor to clear mass of underwater wreckage. He wears self-contained suit, like those worn by human torpedoes. Since no air is obtained from surface pumps, there are no lines to foul.

PWD-OWI Staff Photo

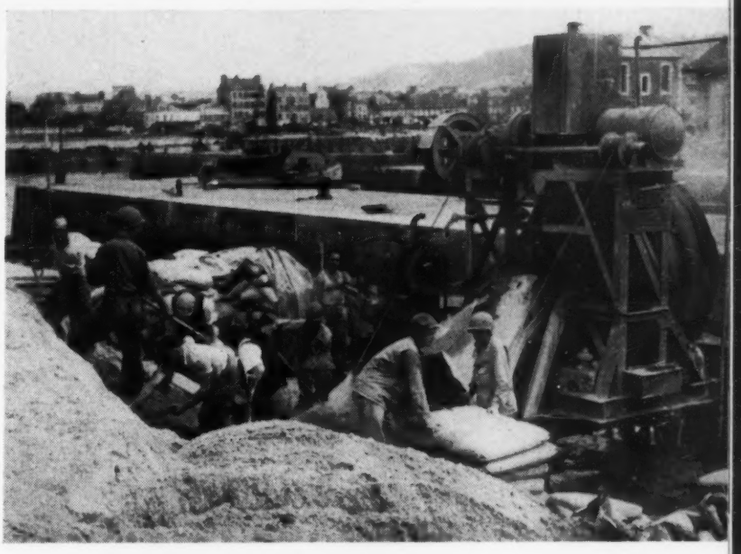
ROLLING STOCK is transported over repaired railroad tracks to main line leading to the front. In background is shattered Gare Maritime where ocean liners once docked.

Signal Corps Photo

REHABILITATION of the port of Cherbourg, key to the Allied supply system in France, was begun immediately after its capture. U. S. and British Navy and Army Engineers had studied photographs and data on Cherbourg for two years before D-Day, June 6, 1944. As soon as the port was liberated, they arrived with ships loaded with special equipment, including power shovels, cranes, air compressors and piledrivers, and crews were set to work reconstructing harbor facilities and repairing rail lines destroyed by the retreating Germans. In three months they had more than doubled the peacetime capacity of the port and supplies were flowing smoothly through it.

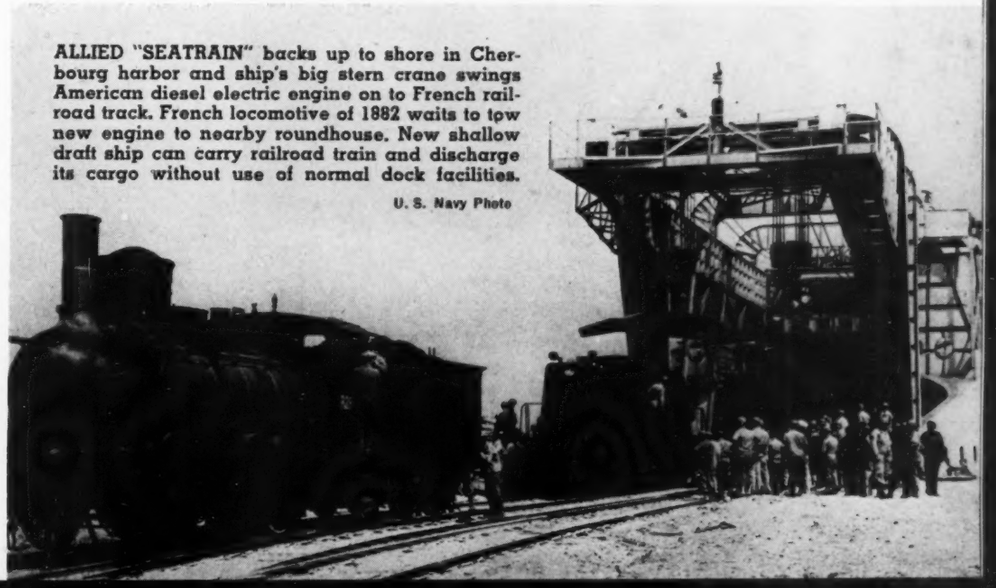
Because of the size and weight of the equipment needed, much of it was brought in by water—some by the new harbor repair ships operated by the Engineers. These are completely equipped floating repair shops with sufficient cargo space to load Army equipment and materials. The Engineer Port Construction and Repair Groups used 3,000 tons of American cement and 6,000 tons of English sand. They poured a total of 12,000 tons of concrete. They used 9,000,000 b. ft. of lumber and 10 American piledrivers drove 10,000 piles. They took 75,000 bolts into Cherbourg and in forge shops quickly set up on the shore pounded out 108,000 drift pins. Portable cranes and derricks mounted on scows moved debris and lifted girders into place. Special buckets for placing concrete under water were used to repair damaged pier foundations. Portable airplane landing mats were placed to make firm roadways around the harbor's edge.

Machinery and materials left behind by the Germans also helped speed repair operations. For filling in the huge quay face where a great number of cargo vessels could be berthed, the Engineers utilized broken-up, concrete German tank obstacles. To this was added debris from blown-up buildings and over it all was poured concrete mixed in captured concrete mixers and hauled in captured German trucks. The unloading platform was built with concrete containing cement stored by the Nazis for use on a rocket launching platform. This project was also the source of concrete for roadways, form lumber for reconstruction of docks and



CONCRETE MIXER and cement brought from England are used by American soldiers, aided by French civilians, to repair dock facilities.

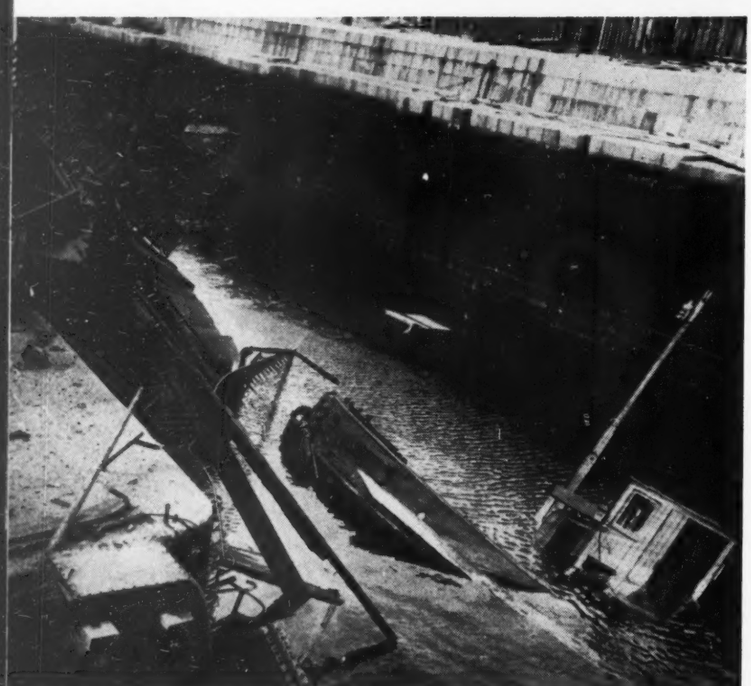
PWD-OWI Staff Photo



ALLIED "SEATRAIN" backs up to shore in Cherbourg harbor and ship's big stern crane swings American diesel electric engine on to French railroad track. French locomotive of 1882 waits to tow new engine to nearby roundhouse. New shallow draft ship can carry railroad train and discharge its cargo without use of normal dock facilities.

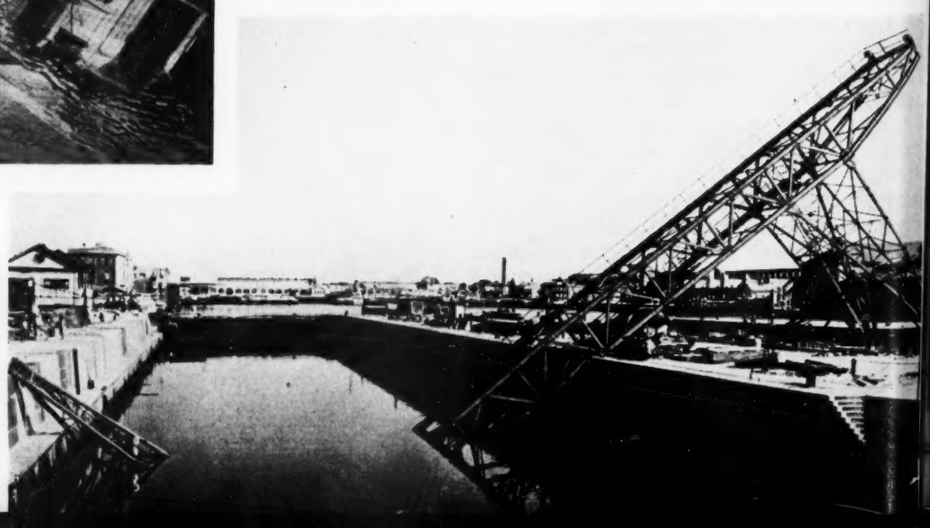
U. S. Navy Photo

AERIAL VIEW of Cherbourg shows damage done by Germans and Allied bombing before its liberation, as well as partial restoration made by Engineers. Only outer end of wharf, at left of quay, appears to be in service. Most of forward end of quay and right side is simply rubble fill in shallow water topped by low wall and cannot be used as wharf. Wide World Photo



SWING BRIDGE wrecked by Germans and boat sunk in passageway block Passe Nord at French naval arsenal. U. S. Salvage Engineers quickly made passageway usable.
Signal Corps Photo

other port facilities, and piling. Hardly an Engineer regiment in the Cherbourg area used less than three German power shovels, a crane or two and a whole fleet of captured trucks. Explosives were supplied by Nazi mines dug out of roads from in front of German fortifications. German pipe, valves and fittings were used to repair the water system and in petroleum installations. German railroad ties and rails were used to augment the existing rail lines about the port.

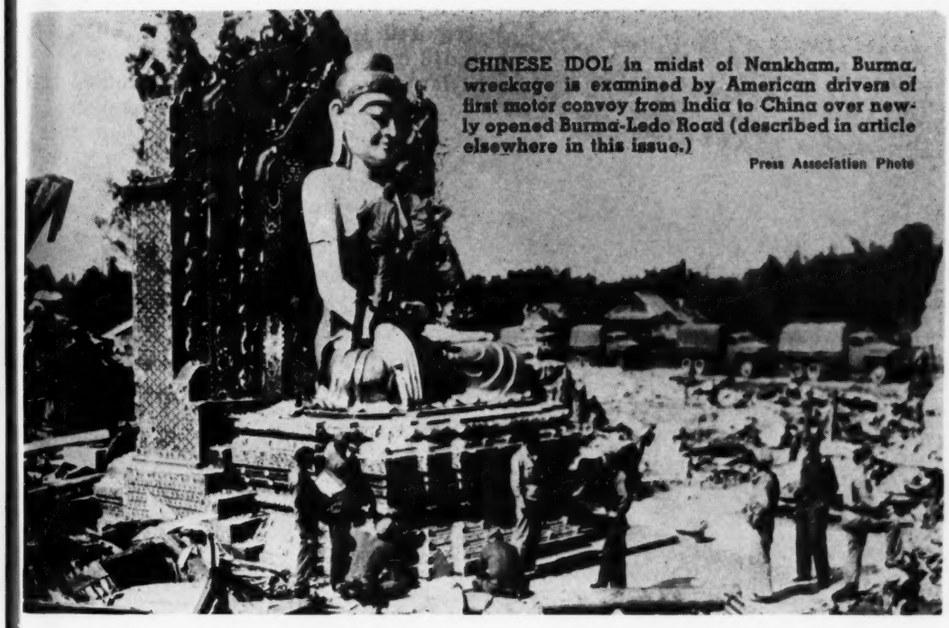


CRANE TOPPLED ACROSS DRYDOCK near Basin Napoleon III represents another Nazi attempt to leave port of Cherbourg useless.
Signal Corps Photo

JOB oddities

SIDEWALK SUPERINTENDENTS of varying sizes are accommodated at demolition job at 51st St. and Fifth Ave. in New York, preparatory to erecting new building for Best & Co. by John Lowry, contractor. Windows in wooden fence around lot are marked "Reserved for Sidewalk Superintendents," while peepholes on a lower level are designated "For Liliputian Superintendents."

Wide World Photo



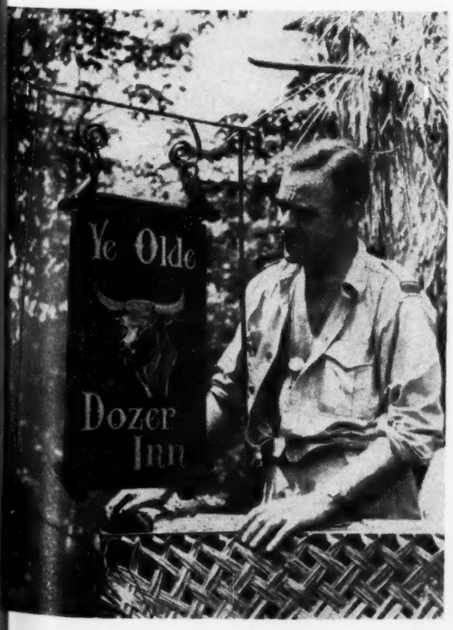
CHINESE IDOL in midst of Nankham, Burma, wreckage is examined by American drivers of first motor convoy from India to China over newly opened Burma-Ledo Road (described in article elsewhere in this issue.)

Press Association Photo

SOLDIERS LAY FAGGOTS (above) on icy roadway in European theater of operations, to make runway for movement of heavy British artillery.

Signal Corps Photo

"YE OLDE BULLDOZER INN" (below) is name given their messhall by members of R.A.A.F. Mobile Works Squadron in New Guinea.

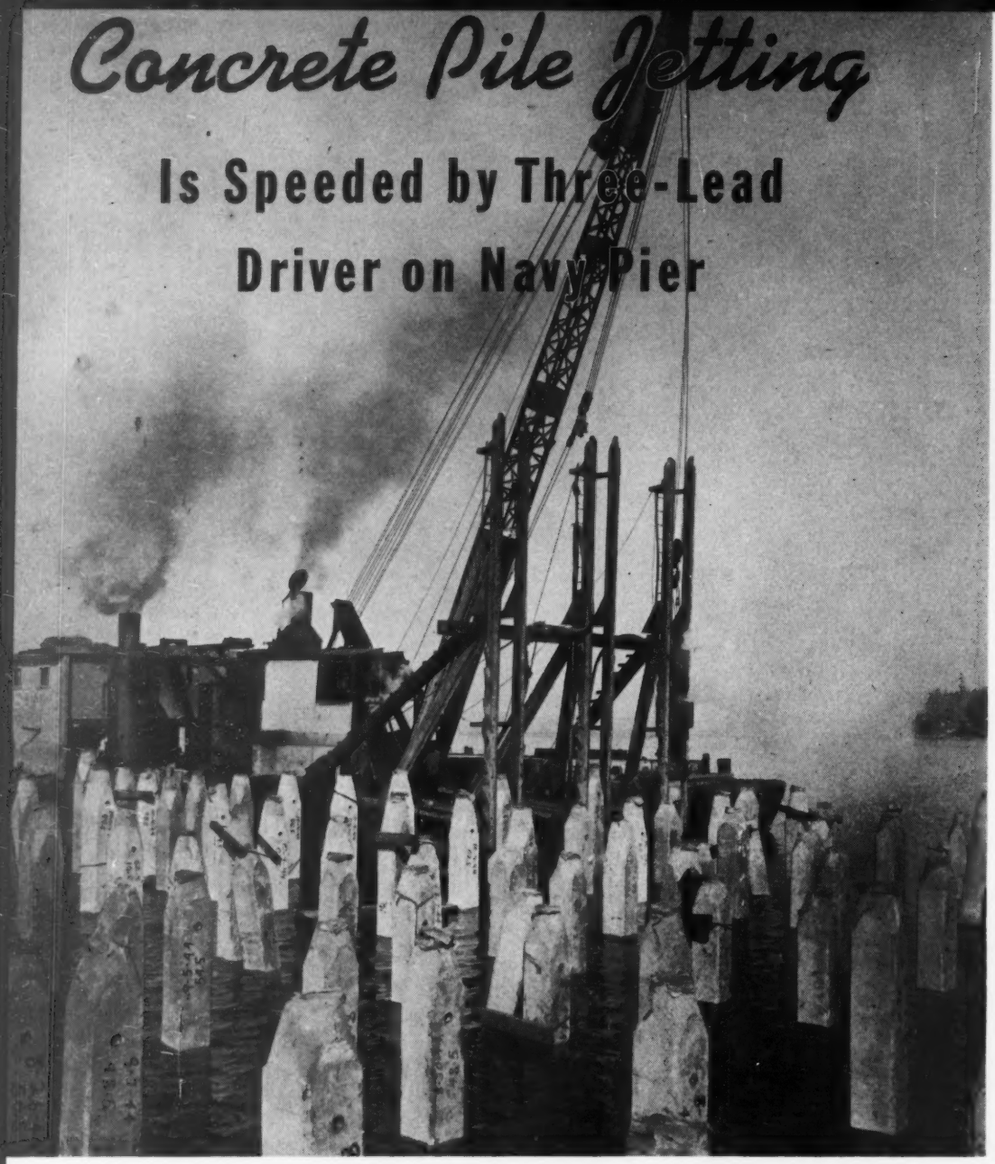


TROOP TRAIN AND BRIDGE (below) are destroyed together by U. S. Army Air Forces bombers in northern Italy. Airmen double effectiveness of bombs by catching trains on bridges and straddling them with bombs.

Army Air Forces Photo

Concrete Pile Jetting

Is Speeded by Three-Lead Driver on Navy Pier



SINGLE STEAM HAMMER (above) serves three pairs of leads. Few hammer blows firmly set pile after quick sinking by jet. Note uniform height of driven pile tops.

BY THE USE OF JETTING, concrete piles were put down to 18-20-ft. depths in well compacted sand and gravel at the site of a Navy pier recently built on the West Coast. After they had been jetted, the piles were set firmly by a few blows from a steam hammer. Heavy loading requirements for the pier (600-800 lb. per sq. ft.) demanded the use of concrete piles 16 and 18 in. square, those piles 60 ft. or longer being of the larger size. In bents spaced 10 ft. on centers, the pile spacings ranged from 8 ft. to 6 ft. 4 in.

The concrete piles were handled by a driver with three pairs of leads, thus making it possible to take advantage of the speed in driving that could be made with jets and decreasing time lost in spotting the driving barge. The piles were cast in forms which had a 3-in. pipe down the center through which water could be pumped at high pressure to provide the required jet action at the tip. A total of 2,418 concrete piles was used on the job, a large percentage of which ranged between 50 and 80 ft. Piles were driven at a rate of 24 to 30 per 10-hr. day to an average penetration of 18 ft. The pump, mounted on the driver barge, delivered 400 to 500 gpm. at pressures of 250 to 300 lb. per sq.in.

Piledriving Methods

Because of the desire for speed, steam-curing methods were used in the casting yard and piles were jetted 7 days after casting. Barge loads of piles ready for jetting were delivered alongside the driving barge where a revolving crane picked them up with a three-point support and placed them in the leads. This same crane handled the automatic steam hammer

VIBRATORS (below) are extensively used to improve slab quality and speed deck surfacing job.

WATER PRESSURE (right) clears centrally located jetting pipe prior to placing pile in one of the leads. Note close spacing of piles.

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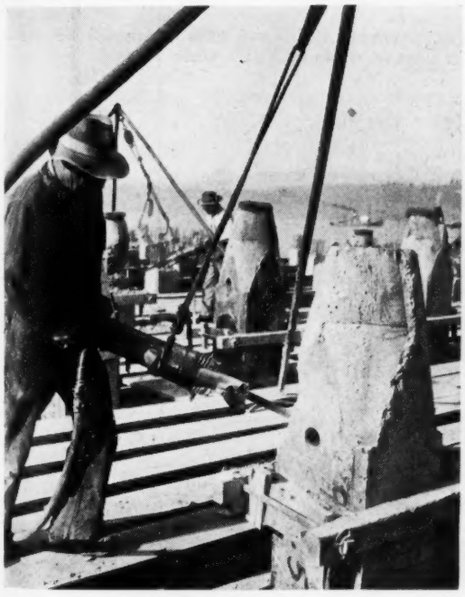
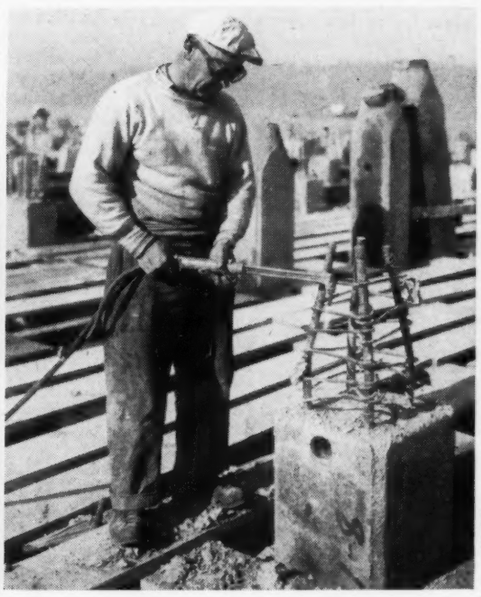
ALL-CONCRETE NAVY PIER is here shown with barge, at left, delivering materials to concrete mixing plant.



BREAKING OFF CONCRETE from tops of piles is done with pneumatic hammer slung from tripod. Note hole used for water jet.



OXYACETYLENE TORCHES burn off reinforcing after concrete has been removed.

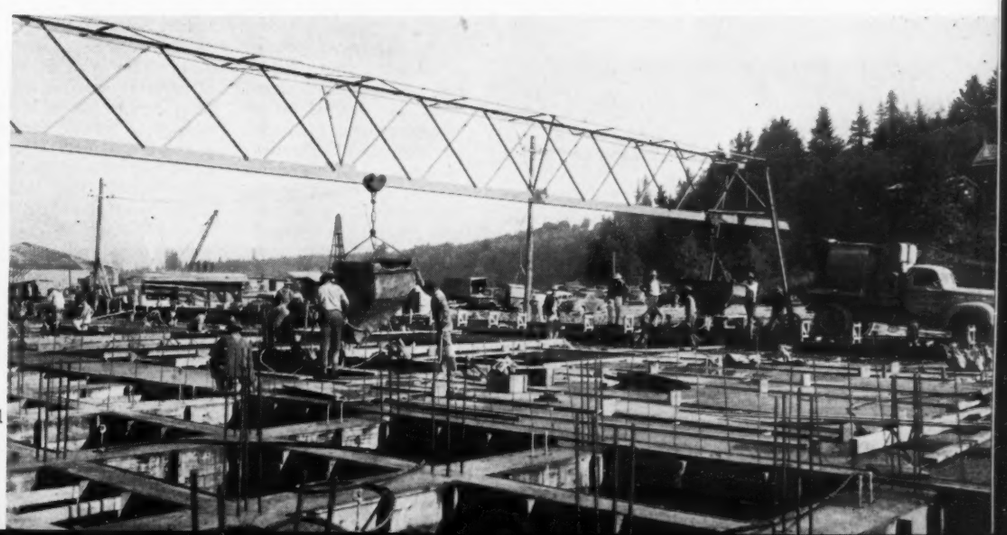
PILE TOPS ARE TRIMMED to exact grade with pneumatic hammer before forms for floor beams are placed.

used for the final few feet of driving after the pile had been jetted down almost to grade.

For each move of the driving rig three piles could be placed, thus materially reducing the amount of time spent in lining up the driver and making for accurate spacing. Once the driving rig was in position, the piles could be placed and the jetting started as fast as the crew could operate the crane that swung them into position. Often the first pile would be down in place and waiting for the hammer by the time the third pile was in the leads so that the crane could be released to handle the hammer. The accuracy with

(Continued on page 144)

STEEL BRIDGE (below) spanning pier deck speeds delivery of concrete from truck-mixer.

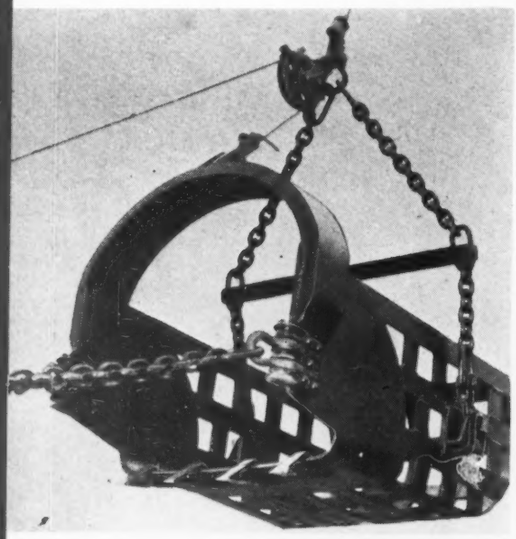


HOW They Did It

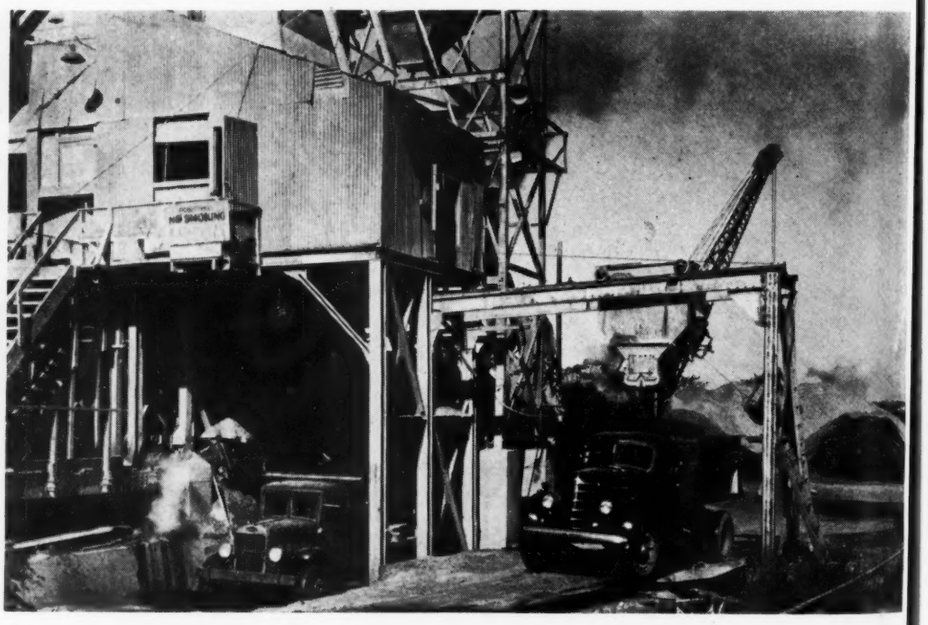
CONSTRUCTION DETAILS For Superintendents and Foremen

PORTABLE PLATFORM for painting bridge in Hinds County, Miss., is provided by Caterpillar diesel D4 tractor with Trackson traxcavator. Air compressor is here shown in separate truck, but in future county engineers plan to mount compressor on front of tractor to produce self-contained portable bridge-painting unit. Small bridge can be painted in 2 hr.

TROLLEY BUCKET (below) on side gantry doubles loading capacity at asphalt mixing plant of Callanan Road Improvement Co., South Bethlehem, N. Y. Second 2-ton pugmill mixer installed in plant discharges into trolley box operated by continuous hauling cable from electric-motor-driven winch equipped with push-button control. Automatic stop spots bucket on overhead track and gate is tripped by steam. Push buttons can be manipulated to let bucket travel beyond automatic stop when desired.

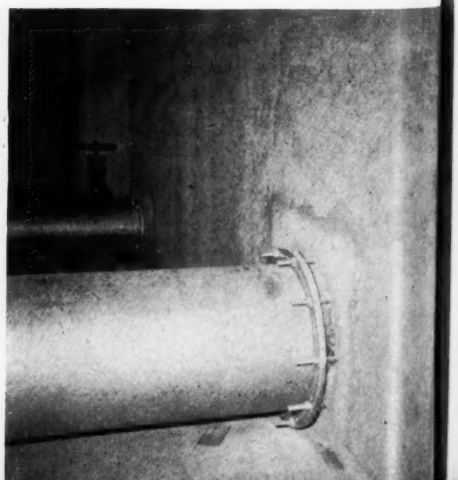


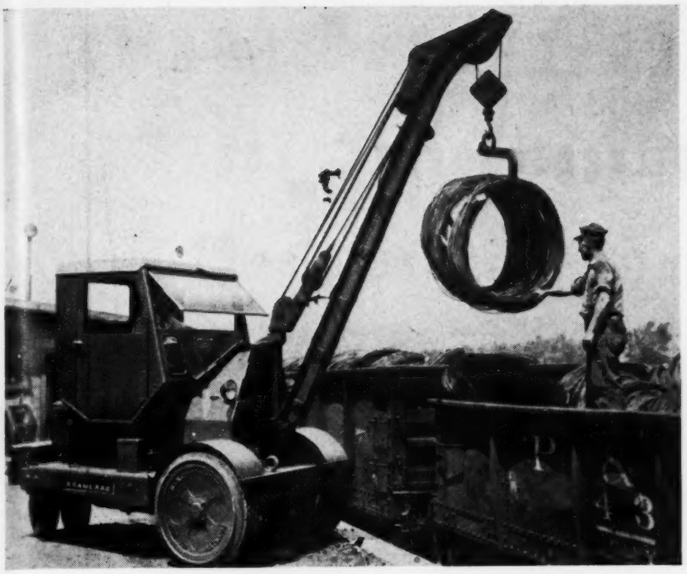
BASKET-WORK DESIGN of Yuan all-welded dragline bucket gives less surface for sticky mud to cling to and eliminates stresses from load binding.
American Manganese Steel Division Photo



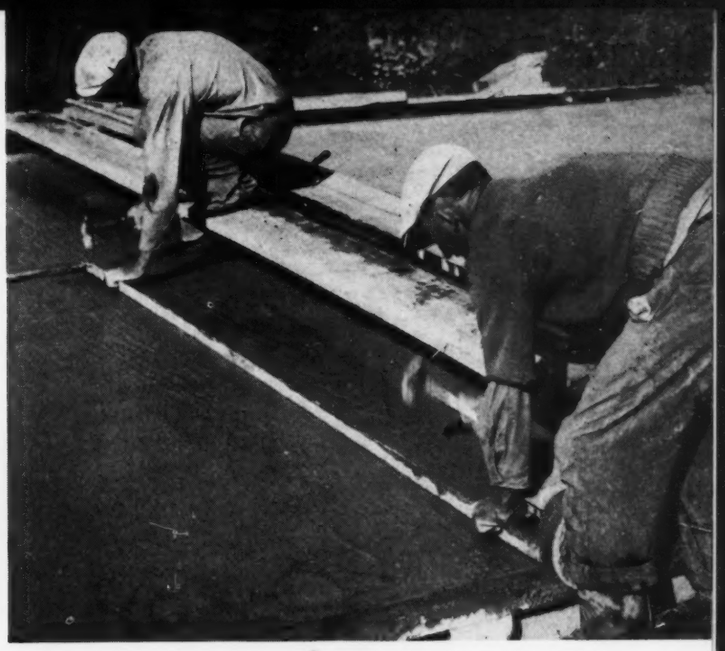
OVERSIZE PNEUMATIC TIRE (below) providing large contact area for better load distribution and traction in soft material is this General Aircat 44 mounted on drive wheel of Sterling truck used by A. I. Savin Construction Co., East Hartford, Conn., on New York municipal airport at Idlewild, where entire site consists of dredged sand fill (described in "Construction Methods" for March). Effectiveness of large tires on drive wheels is reduced by conventional 12.75-20 tires on two front wheels, which tend to sink badly in soft sand.

PIPELINE OF 24-IN. DIA. (below) is brought through building wall below grade by Stearns-Roger Mfg. Co., of Denver, Colo., by means of coupling employing Dresser sleeve and end rings which compress resilient gasket into space between pipe wall and sleeve, forming sleeve into wall at time of pouring and spacing bolts by means of short nipple of proper diameter pipe. Sleeve and bolts are part of permanent installation, while pipe may be shifted through sleeve to obtain any desired adjustment, and packing rings are pulled tight to form dual packing against entry of seepage after line is in place.—From CHARLES C. LYNDE

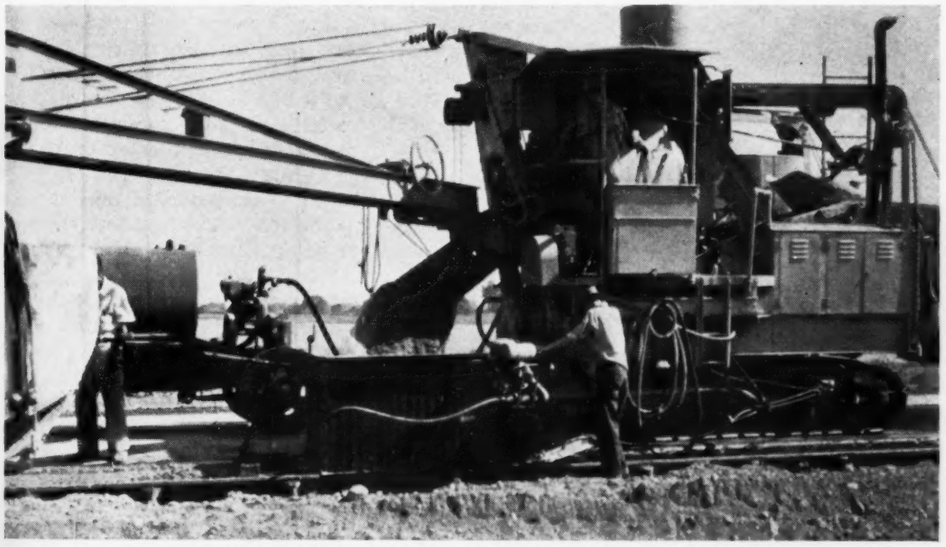


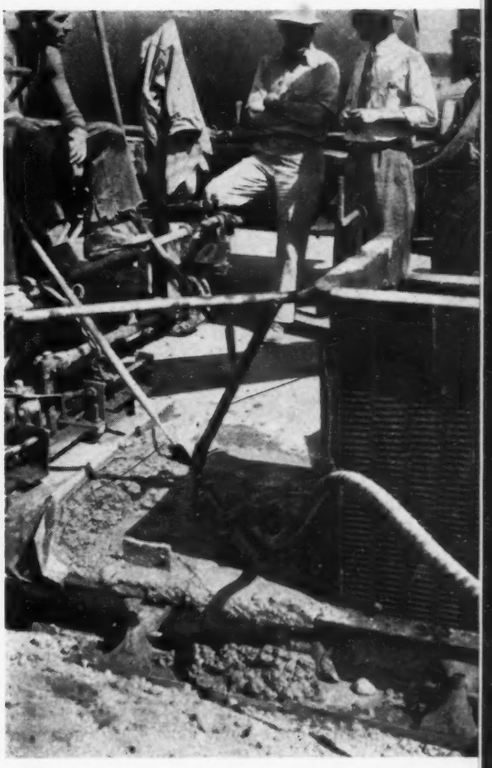


SPECIAL HOOK on 11-ft. swing boom of mobile Krane Kar simplifies handling of coils of steel wire at material yard. Inclosed cab protects operator from cold or rain. Machine, gasoline-engine driven, has front-wheel drive and caster-type rear wheel steer.



GROOVES FOR TRANSVERSE DUMMY JOINTS are made at 12-ft. intervals on concrete resurfacing project in Seattle, Wash. Joint material is hard fiberboard, ⅛x2 in., impregnated with asphalt. All dummy joints are edged with ¼-in. edges.





STEEL SPREADER BOX towed by Koehring 27E paver (above) deposits concrete in 27-in. widening strip on 2.8-mi. section of U.S. 40 in Indiana, as William Daoust, Defiance, Ohio, widens existing pavement preparatory to bituminous resurfacing by W. T. McDonald, Indianapolis. Paver chute delivers full batch to box 6 ft. long and 3 ft. high, with width of 29 in. at top and 26 in. at bottom. Riding on steel angle runners, spreader box strikes off concrete between steel form and pavement edge, leaving slight excess for finisher. Behind spreader box, vibrator attachment (right, above) suspended from swivel arm applies vibration to freshly placed concrete. Two-hp. engine (right) furnishing power for vibrator is mounted on bracket attached to side of steel spreader box. Finishing machine, shortened to small size for this work, strikes off vibrated concrete.

LIFE OF PLOWSHARE (below) is increased five times by application of 1/16-in. thick layer of Haynes Stellite hard facing. Best results are obtained by holding alloy rod and Linde oxyacetylene blowpipe tip to form 45-deg. angle. Flame should be adjusted to produce an excess of acetylene.

Linde Photo

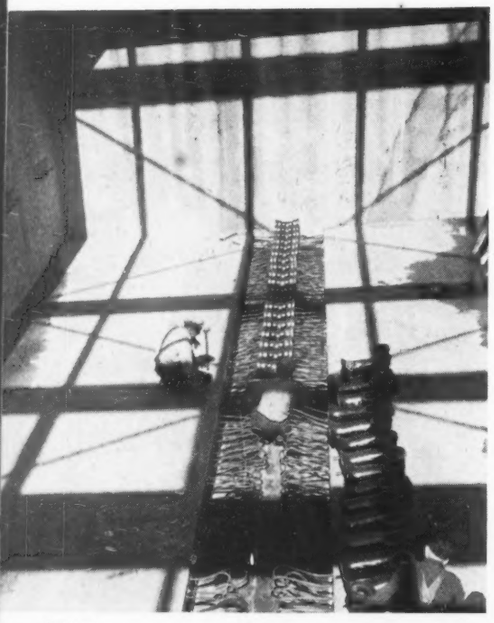
Step-by-Step Field Methods

FILTER TROUGH FORMS "Leapfrogged" For Straight-Line Concrete Placing

TO FACILITATE REPETITIVE USE of steel form units for concreting 720 cast-in-place wash-water troughs in 80 filter basins of Chicago's South District filtration plant, the J. W. Snyder Co., of that city, subcontractor for the concrete work, devised a leapfrog system of making alternate forward moves with duplicate sets of forms, utilizing for this purpose an overhead I-beam trolley hoist which could pick up a complete unit of side forms for one trough at each move. Filter units are arranged in ten banks of eight basins each, and the I-beam track was supported from the steel superstructure framing of the filter building over each row of eight basins, transversely to the troughs and above the mid-points of these units, which have an unsupported length of 25 ft. 9 in.

Construction of the troughs proceeded progressively from basin to basin in a straight line through the eight basins of each row, and the operating line then moved to the adjacent parallel row. With the aid of a movable bridge, spotted over each trough to assist concrete delivery by two-wheel carts, the concrete crew completed nine troughs for one filter basin in an 8-hr. day and maintained a schedule of five filter basins per week, concrete being placed on all days except Thursday and Sunday.

Piping for the underdrains below the wash-water troughs in the filter basins was installed by the principal contractor, Robert Gordon, Inc., Chicago. Well in advance of the placing of steel forms for the wash-water troughs, the J. W. Snyder Co. completed in each filter basin the concreting in place of 54 special cast-iron effluent pipe tees, 6x4-in. bell and spigot, on a plywood form over the ef-

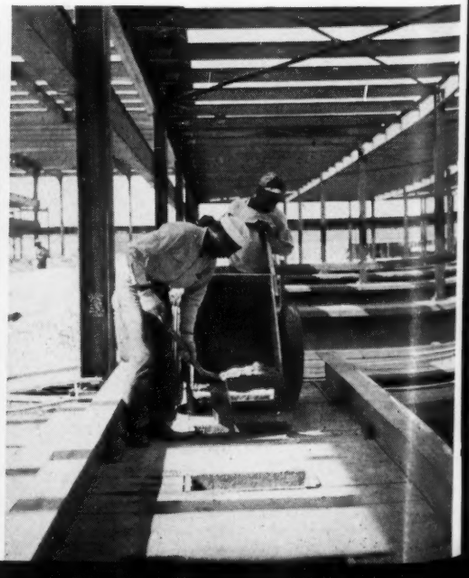


1 BEFORE PLACING SLAB CONCRETE over effluent duct, workmen set cast-iron pipe tees upright on plywood form and anchor them with temporary tie-bolts extending upward through form to timber blocks on top of tees. Each basin is equipped with 54 of these tees to provide connections for 108 separate lateral effluent pipes.

2 ELECTRIC HAMMER supported by improvised stand cuts recess 2 in. deep for trough anchor in filter basin wall.

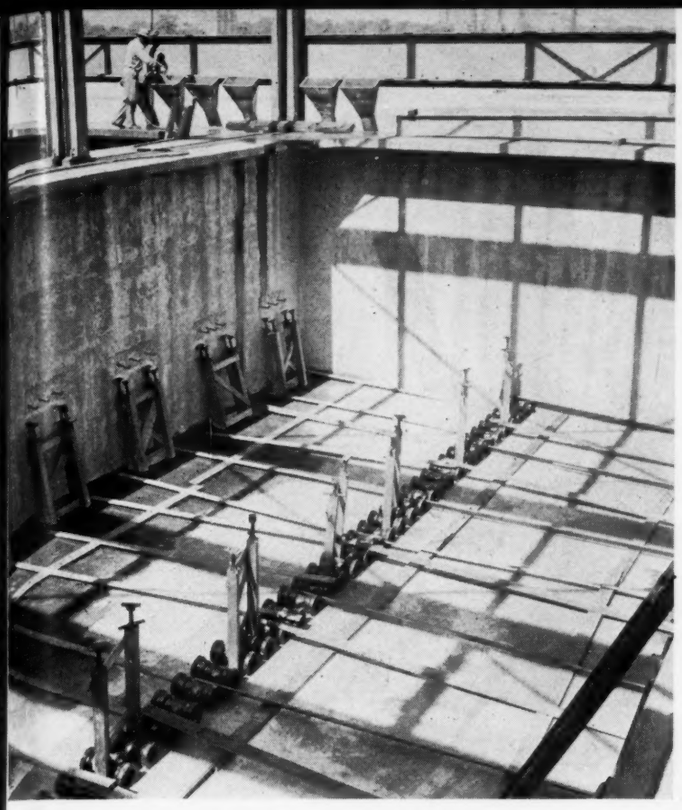
3 CONCRETE PLANT (below) utilizes ½-cu.yd. portable mixer from which concrete is delivered by two-wheel carts to movable bridge mounted on wheels for easy rolling. Overhead I-beam track carries trolley chain hoist used in moving forms and other equipment.

4 FIVE APERTURES in rolling bridge (below) provide flexible control in delivery of dumped concrete from carts through spouts to forms below. After dumping load, empty buggy moves forward to opposite wall and back to mixer without any backing or turning.



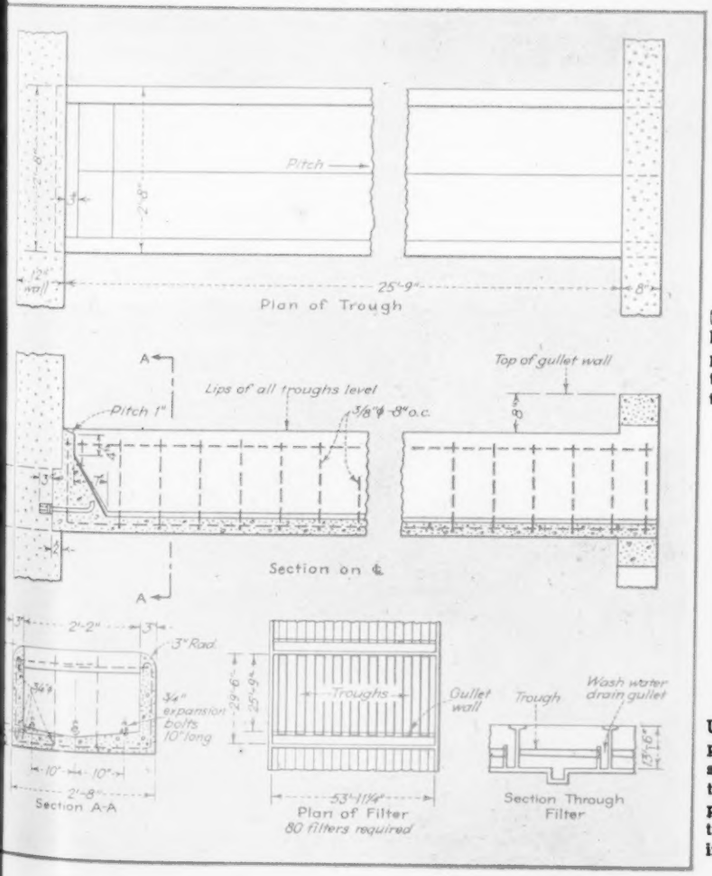
5 FALSEW trough livery of bottom

EACH FILTER B prising 80 basin crete wash-wate Trough, which h in 2-in. recess in of wash-water c

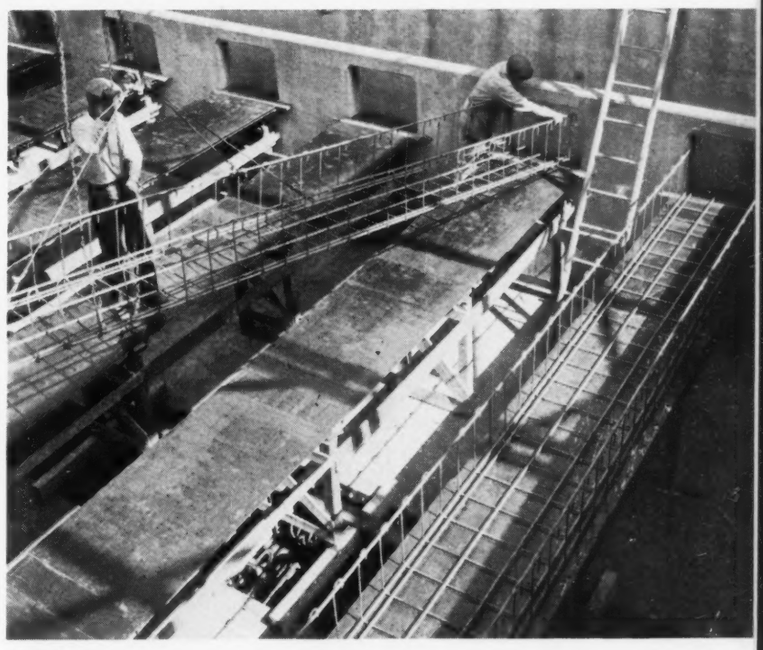


5 **FALSEWORK FRAMES** equipped with adjustable jacks to support trough forms at proper grade are set up in filter basin prior to delivery of bottom forms by overhead trolley hoist.

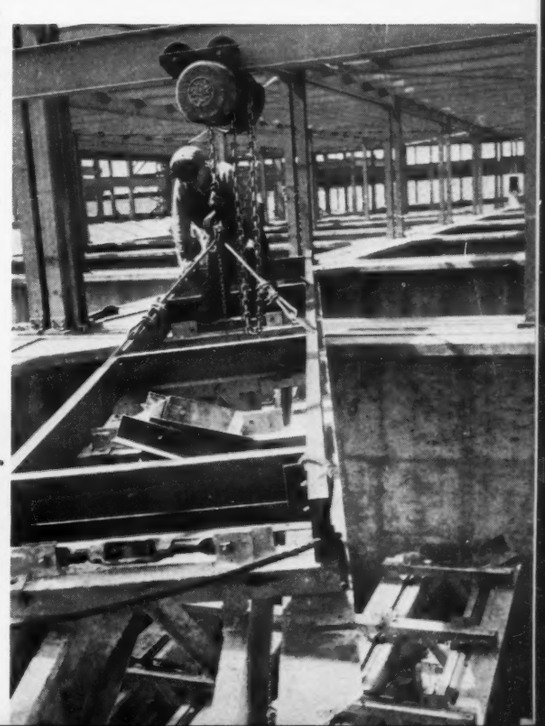
EACH FILTER BASIN (below) of Chicago's South District filtration plant, comprising 80 basins, requires construction of nine cast-in-place reinforced-concrete wash-water troughs, making a total of 720 troughs for entire plant. Trough, which has unsupported length of 25 ft. 9 in., is anchored at one end in 2-in. recess in basin's wall and rests at other end in opening through wall of wash-water drain gullet.



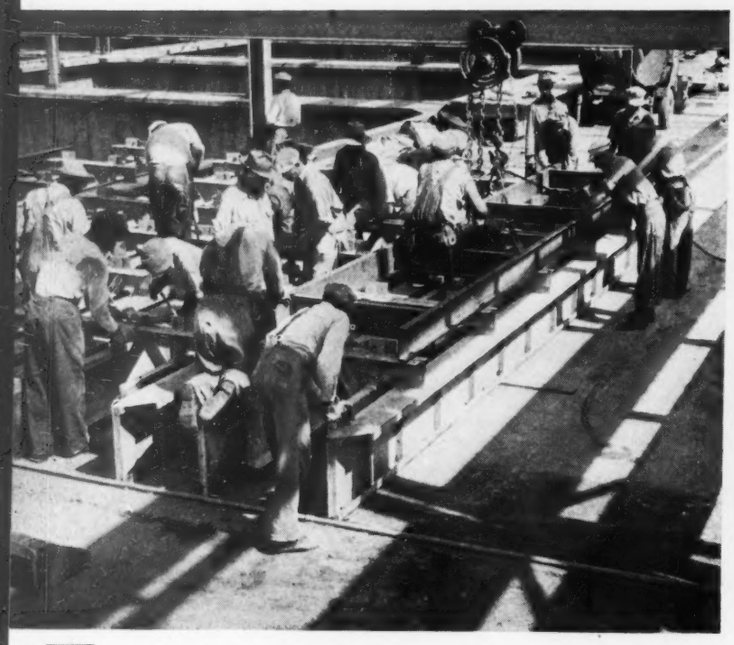
6 **AFTER STEEL BOTTOM FORMS** for nine wash-water troughs have been set to grade on falsework supports in filter basin, trolley chain hoist delivers prefabricated cages of reinforcing steel to be set in position on forms. Note that bottom forms include small plates over supports which can be left in place when main sections of these forms are removed.



7 **REINFORCING CAGE** (above) lowered by chain hoist is set carefully in position with end extending into opening through gullet wall.



8 **COMPLETE SIDE FORM UNIT** (right), with double panels attached for two sides of wash-water trough, is moved into position for lowering by trolley chain hoist traveling on I-beam monorail.



9 IN TRANSIT from one filter basin to next, side form units are lowered on to operating floor slab over pipe gallery for hand scraping and cleaning. All forms are thoroughly cleaned in this way before each use.

10 OVER REINFORCING STEEL previously set in position, side form units are lowered and bolted to bottom form. Form units are equipped with spacer bars and turnbuckles for adjusting side panels.

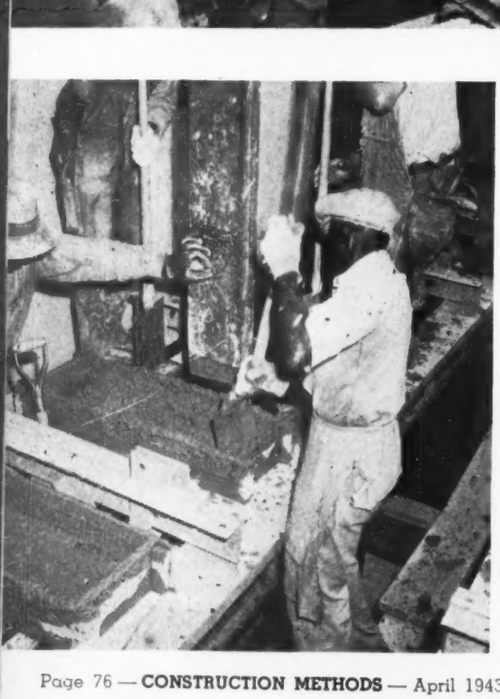
11 UNDER ROLLING BRIDGE (left) mounted over last of nine wash-water troughs in this filter basin are five spouts which deliver concrete from buggies into forms.

fluent duct. The 4-in. lateral piping, connected to the tees, was installed later by the principal contractor, after the troughs had been completed.

Filter basins are grouped in operating units of 20 basins each, with a pipe gallery extending the length of each unit between two banks of ten basins. The pipe galleries, four in number, lie at right angles to the trolley beam set up by the concrete subcontractor for his straight-line series of trough construction operations in each row of eight basins.

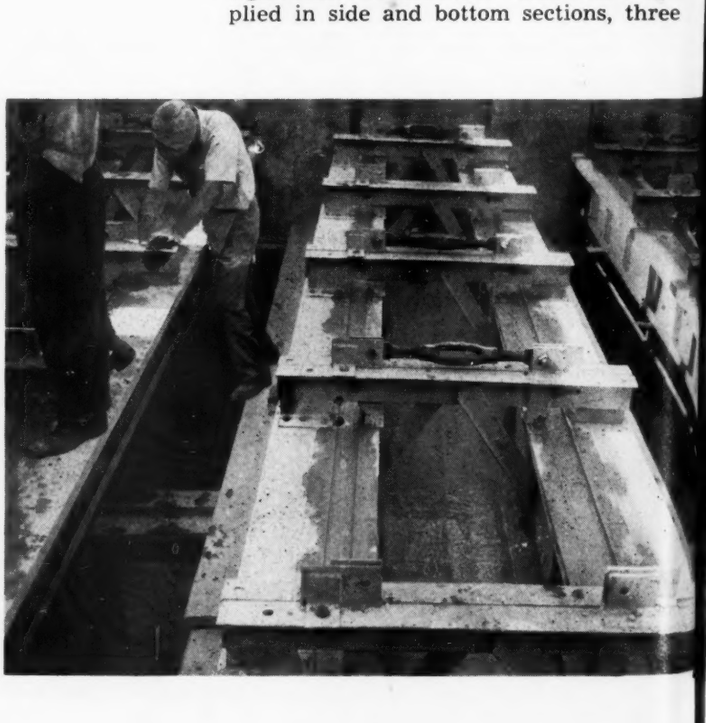
Trough Forms

Dimensions of the reinforced-concrete wash-water troughs are shown in an accompanying drawing. Specially designed Blaw-Knox steel forms were supplied in side and bottom sections, three

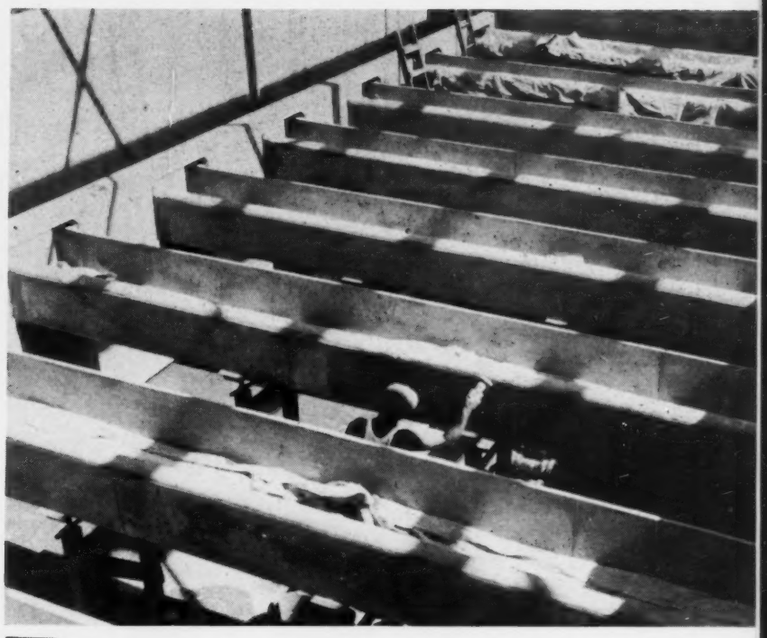


12 "SHALLOW DISTRIBUTION HOPPERS (left) set across forms under spouts are slotted at both ends to permit packing of concrete through side forms into bottom form. Note packing spade behind man's arm at left.

13 AFTER TROUGH FORMS (right) have been filled with concrete, weir edges at tops of trough sides are rounded to 3-in. radius, as shown by accompanying drawing. Cement finishers at left are working on weir lips of one trough and will move next to trough in center.



14 **STRIPPED OF SIDE FORMS,** troughs are covered with tarpaulins which are kept wet to protect concrete during curing period.



15 **SUPPORTED ON SMALL PLATES** left in position on falsework jacks after main bottom form sections have been removed, concrete troughs are given final finish with rotary grinder used on weir lips.

nine-trough sets of bottom forms and two nine-trough sets of side forms. Side forms for each trough were of framed one-piece design which could be stripped, raised and moved as a unit. Steel bottom forms were sectional in character; they could be dismantled to leave narrow dividing plates at points of support under a trough, freeing the main sections of the form for use elsewhere.

Before the concrete crews started operations, workmen from the American Concrete Breaking Co. cut 2-in.-deep recesses for the troughs in the side walls of the basins and installed anchors for the reinforcing steel.

Concrete was mixed by a CMC gaso-

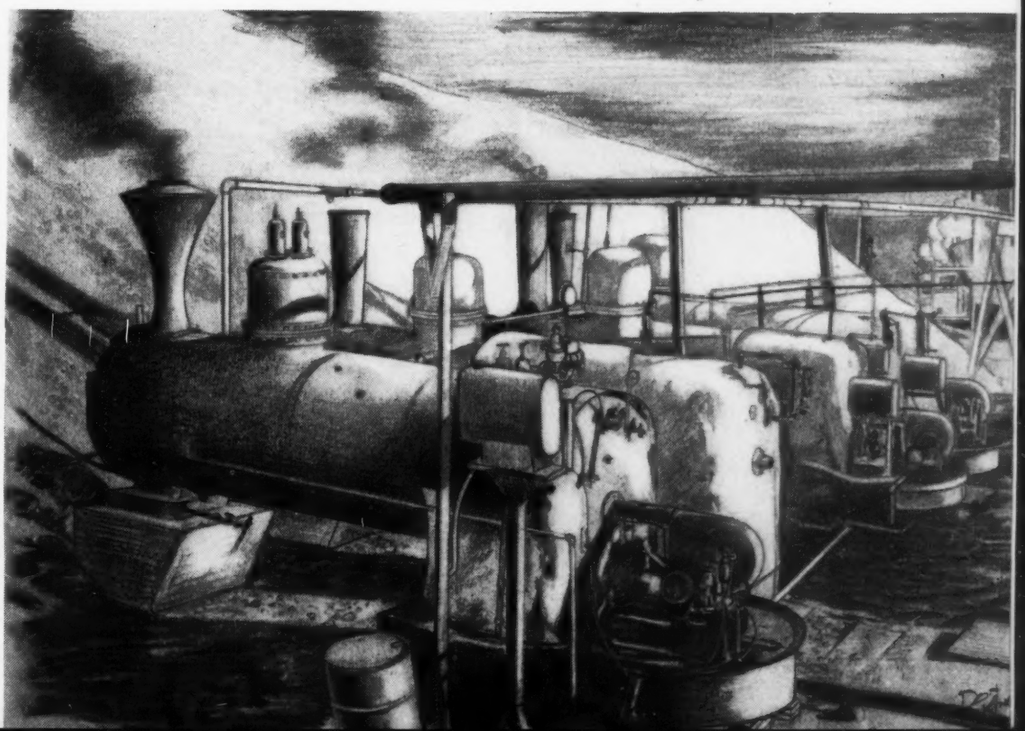
(Continued on page 162)

Captured Jap Boilers

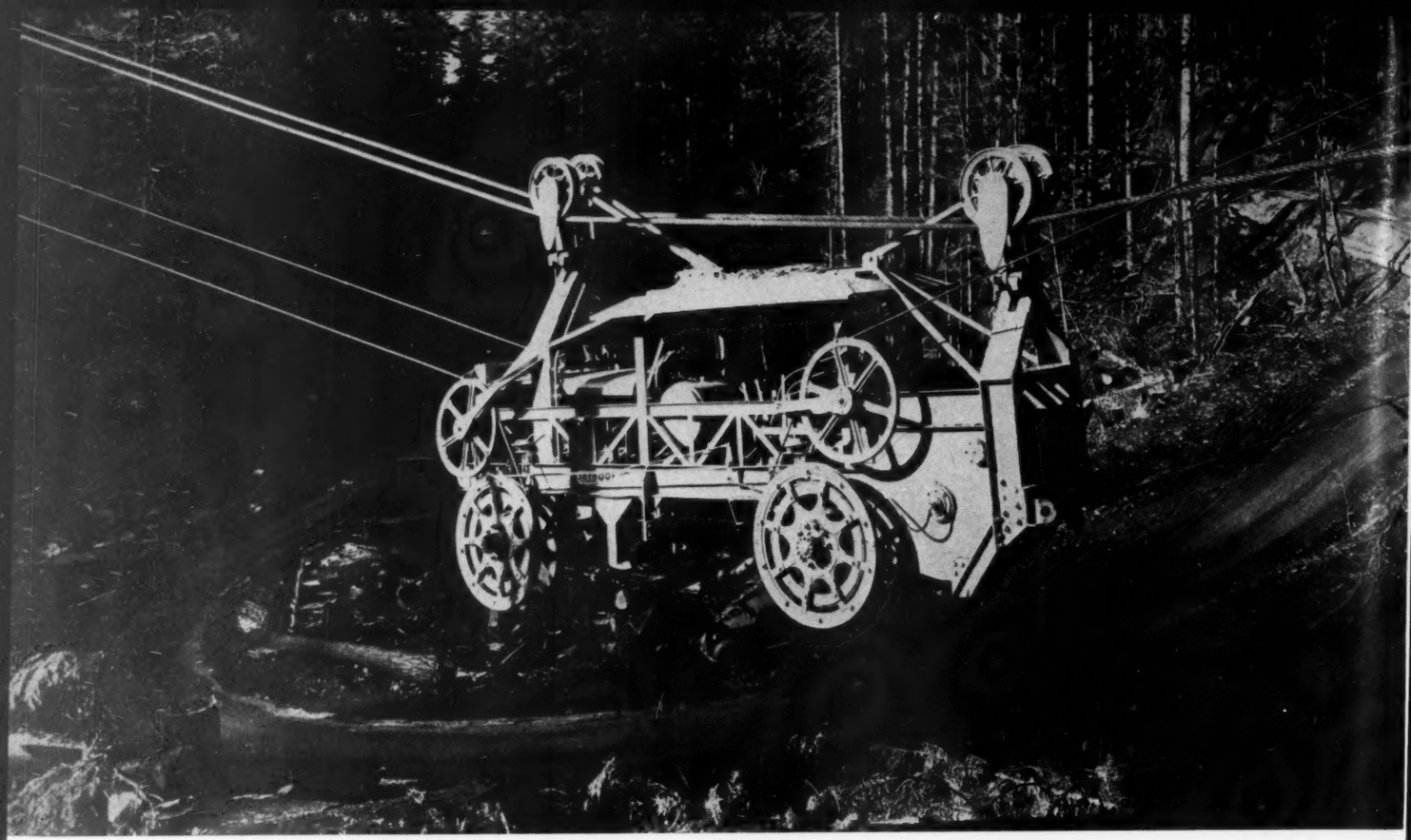
Transferred from Locomotives to Serve Asphalt Plant for Surfacing Saipan Airfield

INGENUITY OF U. S. ENGINEER TROOPS in making use of scrap materials and salvaged and captured enemy equipment has been evidenced in all theaters of the world. The accompanying illustration, a pencil drawing by Don King, Army Air Forces, is an example of improvisation in the construction of an asphalt heating plant on Saipan. The Aviation Engineers, finding themselves short of steam generating equipment, obtained and installed several stationary boilers and four locomotive boilers which were captured from the Japs. These boilers were adapted to the use of diesel fuel.

The blowers seen in the illustration forced air into the dryers for vaporization, thus conserving steam pressure. Note the overhead steam lines. The large aggregate stockpile in the background was used in the asphalt mix for surfacing the first airfield from which our B-29 Superfortresses were able to bomb Tokyo. The asphalt plant was built at the quarry site, the hot mix—127,332 tons of it—being hauled from the plant to runway in 2½-ton dump trucks.



INSTALLED IN ASPHALT PLANT to produce material for surfacing airfield runways, these four steam boilers (right) were taken by Aviation Engineers from locomotives captured from Japanese.



AERIAL TRAMWAY TRANSPORTER capable of lifting and moving 30-ton loads is self-contained unit carrying its own operator and power plant to drive traction sheaves and hoisting drums. Single turns of ¾-in. traction cables around power sheaves furnish grip sufficient for carriage to pull itself with load up steep grades.

25-TON LOAD of fir logs (below) is hoisted by tramway carriage for aerial transportation to landing.

Self-Propelled Cableway Carriage

Hoists and Hauls 30-Ton Loads

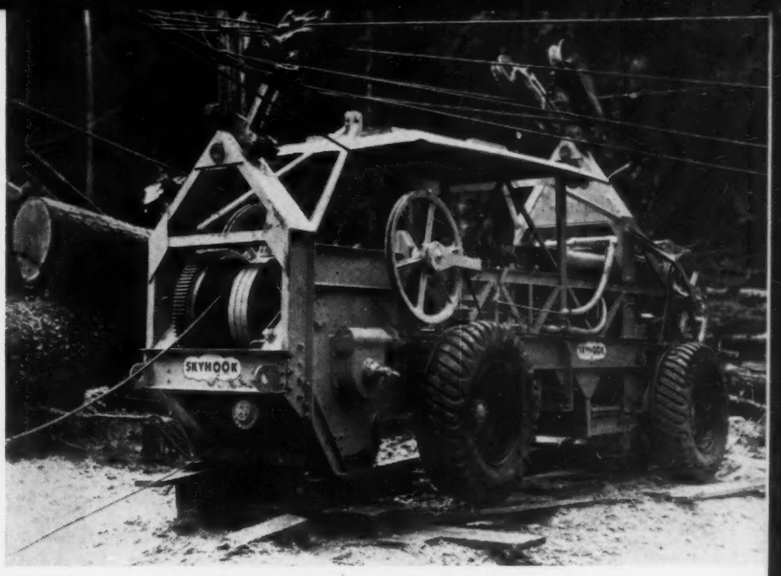
FEATURING A SELF-CONTAINED four-wheel cableway carriage which provides its own power for both traction and hoisting, under control of an operator who rides in the vehicle, a new development in aerial tramway transportation has undergone successful test in the mountainous logging country of northern Oregon on an operation of the Ostrander Railway & Timber Co. Traveling on twin 2-in. steel track ropes suspended from trees or towers by special hangers allowing unimpeded transit of the machine, the 10-ton carriage, named the Skyhook by its maker, the Pointer-Willamette Co., Portland, Ore., propels itself in either direction by means of power-driven sheaves around which are wrapped single turns of ¾-in. traction ropes anchored at both ends of the cableway.

Built into the vehicle are two individually-operated power drums wound with ⅞-in. wire rope for lifting loads. With the hoisting and hauling functions thus contained in the transport carrier, the tramway operates without the moving cables and stationary hoist engine required by a conventional cableway.

Sets of sheaves on the two sides of the carriage provide sufficient grip on two ¾-in. traction ropes to enable the carriage to pull itself with a load up a grade

AT CONTROLS of cableway carriage sits **PHIL GRABINSKI** (right), veteran logger and inventor of skyline machine.

TRAMWAY HANGER suspended from guyed tree supports 2-in. track cables in open frame permitting passage of vehicle.



TO MOVE ON GROUND under its own power from one location to another, tramway carriage mounts pneumatic tires on rims attached to power sheaves.

of 50 percent and to travel unloaded up a 78 percent grade. The demonstration model can hoist and transport 30-ton loads. In a test on a 2,000-ft. cableway taking logs down a 30 percent grade, with only one choker setter on the ground to attach the logs, the machine moved 100,000 b.ft. in 5 hr. It is estimated that the unit can take 5,000 b.ft. at a time and can move 150,000 b.ft. in a day with a five-man crew consisting of the operator and four men on the ground.

Although the tramway can be extended for unlimited distances over any kind of terrain by using a sufficient number of intermediate hangers, practical considerations indicate that 5,000 or 6,000 ft. would be a profitable operating length. Possibilities are envisioned for applying the Skyhook to construction operations on dams, bridges and earthwork. Each application of the apparatus is engineered to fit the job. In moving from one location to another, the machine can travel on the ground under its own power, pneumatic tires being mounted on the sheave driving wheels for this purpose.

18-YD. **HEAPED LOAD** rides to dump in cable-operated scraper behind crawler tractor.

TRACTOR-SCRAPERS AND BULLDOZERS (below) grade locations for parallel railroad and highway. Grading on 5,000-acre site involves about 3,500,000 cu.yd. of earthmoving.

Fast Earth-Moving Job

LEVELS ROLLING HILLS

MOVING SOME 3,500,000 CU.YD. of material in a hurry is the first requirement at a large Navy depot job on the West Coast. Because other features of the project have to await completion of the grading, the urge for speed demanded all available equipment for handling yardage on a large scale. The general contract is held by a combination officially known as "Barrett & Hilp-D. McDonald and H. O. Rutherford, a joint venture."

In preparation for the work, the contractor assembled 100

CUTTING 100 FT. OFF HILL, bulldozers on bench half way down rehandle soft sandstone to edge of second slope, where material falls 50 ft. to power shovels loading trucks.

DOZER LOAD is pushed by tractor to edge of bench for gravity delivery to power shovels 50 ft. below.

BULLDOZERS (below) speed work by breaking 2 ft. of hard adobe topsoil for fast scraper loading.

dump trucks of 5 to 10-cu.yd. capacity, 22 Terra-Clipper 18-cu.yd. carrying scrapers (Wooldridge Mfg. Co.), 9 Tournapulls (R. G. LeTourneau, Inc.), 18 bulldozers (mostly Caterpillar tractors), 4 2-cu.yd. Northwest shovels, 6 1¾-cu.yd. draglines, 22 12-ton rollers, 18 motor patrol graders and 12 petrolithic rollers.

Although the earthmoving is spread out in widely separate locations over a project which covers more than 5,000 acres, much of it is concentrated in cutting down some of the rolling hills. At one hill this grading operation reaches a total depth of 100 ft.

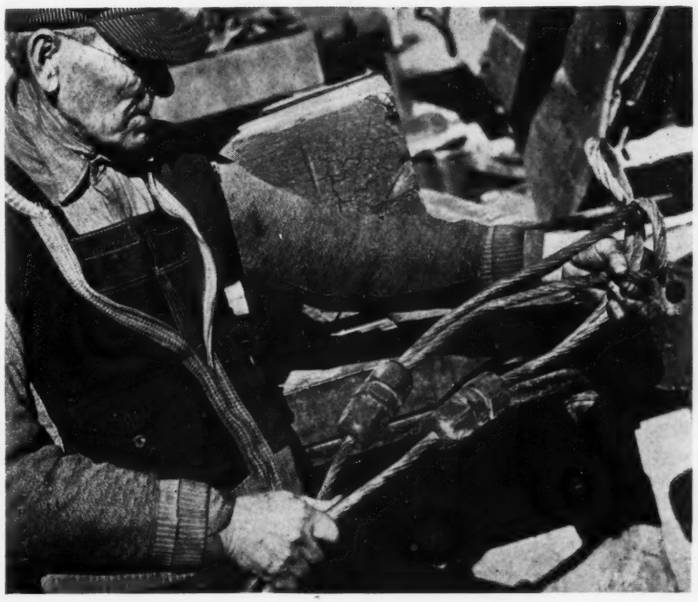
For this heavy grading the contractor puts bulldozers on the top of the hill, aided by rooters where desirable, to push the material over the edge of a slope, standing on as steep an angle as the loose material will retain. On the 100-ft. height, a bench was cut half way down, where material could be rehandled by bulldozers which again pushed it over the edge, thus maintaining, at the toe of the slope, 100 ft. below the crest, a dump truck loading point where power shovels could work to good advantage.

Job construction calls for 30 mi. of railroad, 25 mi. of asphaltic concrete roads, 175 reinforced-concrete ammunition magazines, and a concrete lined reservoir and involves the placement of about 100,000 cu.yd. of concrete. Railroad tracks are laid on 8 to 10 in. of rock ballast spread on well compacted subgrade. On the roads, the base consists of 14 in. of rock placed in three layers. The first 8 in. is quarry-run rock up to 6 in. in size. On top of that are placed two 3-in. courses of crusher-run rock up to 2½-in. size. This base is topped with 2 in. of asphaltic concrete.

The general contract is being carried out under supervision of Capt. F. C. Bedell, C.E.C., USN, representing the Navy's Bureau of Yards and Docks. Lt.-Comdr. Ralph Jensen, USNR, is officer in charge of construction. In charge for the contractor is George B. McKeever, general superintendent for Barrett & Hilp. Donald ("Curly") McDonald is acting field manager in the joint venture.

Parts Department IMPROVISES MATERIALS AND METHODS FOR *Equipment Repair*

By C. F. MOORE
Property Clerk and Supervisor
Parts and Stock Department
Brown Construction Co., Pueblo, Colo.



C. F. MOORE examines section of wire cable which was retired from machine use, serviced and repaired, and is giving a good account for itself in its second job.

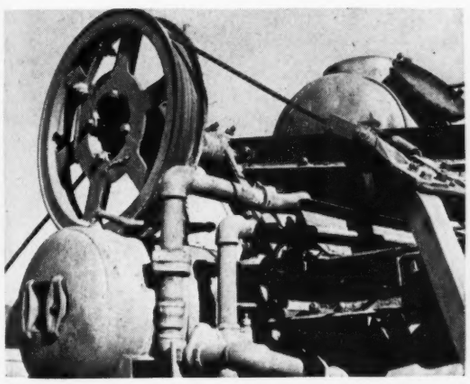
BY THE MIDDLE OF 1944 we thought we would be able to revamp our parts department and reserve replacement stock by the first of the year. For the last two years we have been using anything we could locate for equipment repairs and replacements. Many rebuilding jobs required repeated trips to the junk pile for parts.

For 1945 our parts department is being operating much as it has been for the last two years of the war. But this does not mean that we need to let down on our maintenance program or service. We have found that we can do a near factory building job in our own repair shop. Locating the required parts for this work takes longer this year than last. We expect to have more trouble in keeping a reserve stock on the commoner parts, but to offset this is our more than two years' experience in making what we have last.

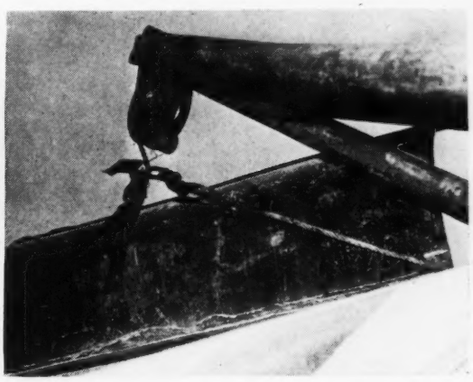
We have learned to build reserves in commoner items. These are made up in the machine shop when demand work is light. The policy tends to keep a full repair and maintenance crew on an even schedule. And we have learned where to locate most 'substitute' parts and replacements.

On a recent war job we needed a double weight rock plow. In this case it was not a lack in priority. There was no plow of the size and type we needed on the

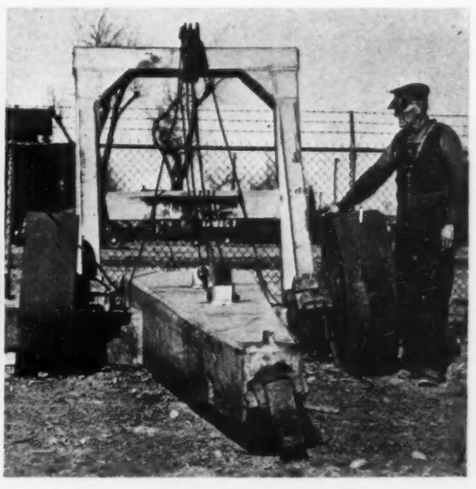
(Continued on page 142)



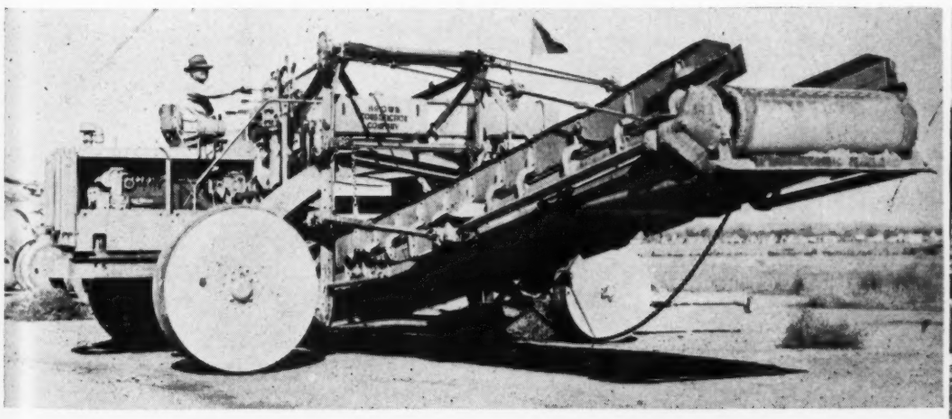
ROTARY HOIST on large paver which was rebuilt from salvaged equipment and parts bin, is operated by preformed wire rope.



TRUCK WINCH made from salvaged material is equipped with wire rope retired from dragline use, and rated "job's busiest piece of machinery."



ROCK PLOW (below) was built with help of an engineer from Denver, for use on a war-contract job. No plow of size and type (20-ton) was to be found on the market. Plow is equipped with ½-in. endless cable.



ELEVATING CONVEYOR, formerly equipped with chains, was rebuilt, using wire rope as substitute.

CAREFUL REBUILDING Modernizes Pa

By A. H. HINKLE
District Engineer, The Asphalt Institute, Cincinnati, Ohio

RESURFACING AND WIDENING of old pavements have come to be recognized and generally accepted as the necessary and not unwelcome corollaries of advancing age and increasing traffic density and speed. Large money savings ordinarily can be realized by salvaging an existing pavement and adding to its width and thickness, in comparison with the cost of tearing it out completely and replacing it with entirely new construction, and this fact gives constantly growing prominence to the problem of adequate design and dependable construction in the widening and resurfacing of old pavement. Salvaging of existing pavement is feasible on the major portions of old highways, where line and grade requires little or no correction to satisfy modern standards.

Unpredictable traffic developments sometimes necessitate widening or resurfacing or both on a relatively new and modern pavement. Where a heavily traveled highway in a rural area is to be revamped into a divided design, with a separate roadway for one-way traffic in each direction, the old pavement may be utilized as one of the two roadways. Some state highway departments are taking full advantage of every possibility for this type of economical construction.

If grade and alignment are satisfactory or can be made to fit into the revised plans, most old pavement usually can be salvaged economically as a base for new

RUTTED BY TRAFFIC crowded off heavily traveled 18-ft. pavement, metal shoulder shows that widening is needed.

HEAVY ASPHALT CEMENT of about 35 penetration forced under concrete pavement by pump on distributor corrects "pumping" joints before resurfacing is placed. This method is recently developed counterpart of mud-jacking process.

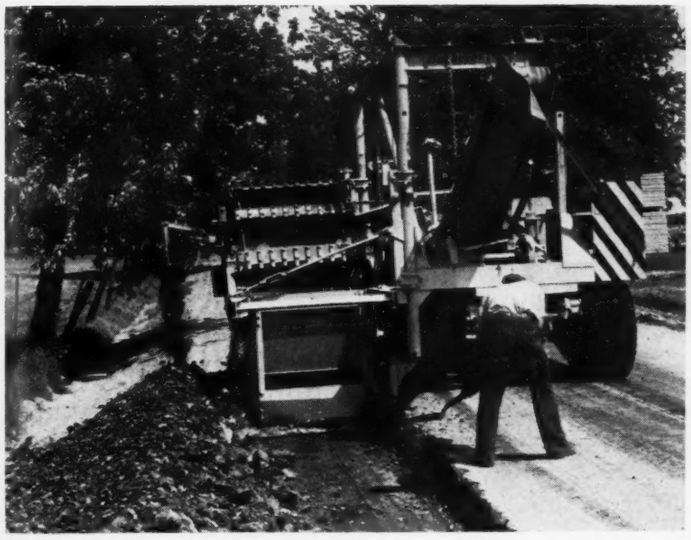
BEFORE RESURFACING, loose material and joint filler showing excess asphalt is removed from cracks in old concrete. Here large cracks are being refilled with sheet asphalt mix which is well compacted by tamping before rolling.

...Pavements

FOR IMPROVED SERVICE AT MODERATE COST

IN TWO PARTS . . . Part 1

SEVEN EXAMPLES of recommended design for widening and resurfacing of old pavement indicate features which have generally proved satisfactory for following conditions: (1) Old, very rough pavement resurfaced without widening; (2) widening constructed with steel side forms; (3) and (4) widening constructed without side forms; (5) wedge course used on old pavement widened without use of side forms; (6) leveling or "scratch" course used to true up old rough bituminous surface prior to placing 1½-in. over-all resurfacing course; (7) old thin bituminous pavement on granular subsoil widened and resurfaced with two thin courses to obtain necessary smoothness as well as increased bearing value.



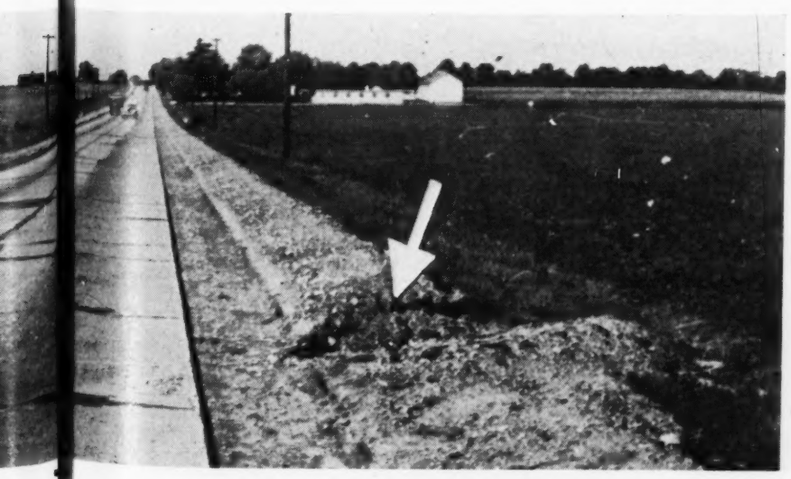
TRENCH FOR WIDENING is excavated alongside old pavement by Buckeye traction ditcher capable of cutting to maximum width of 4 ft.

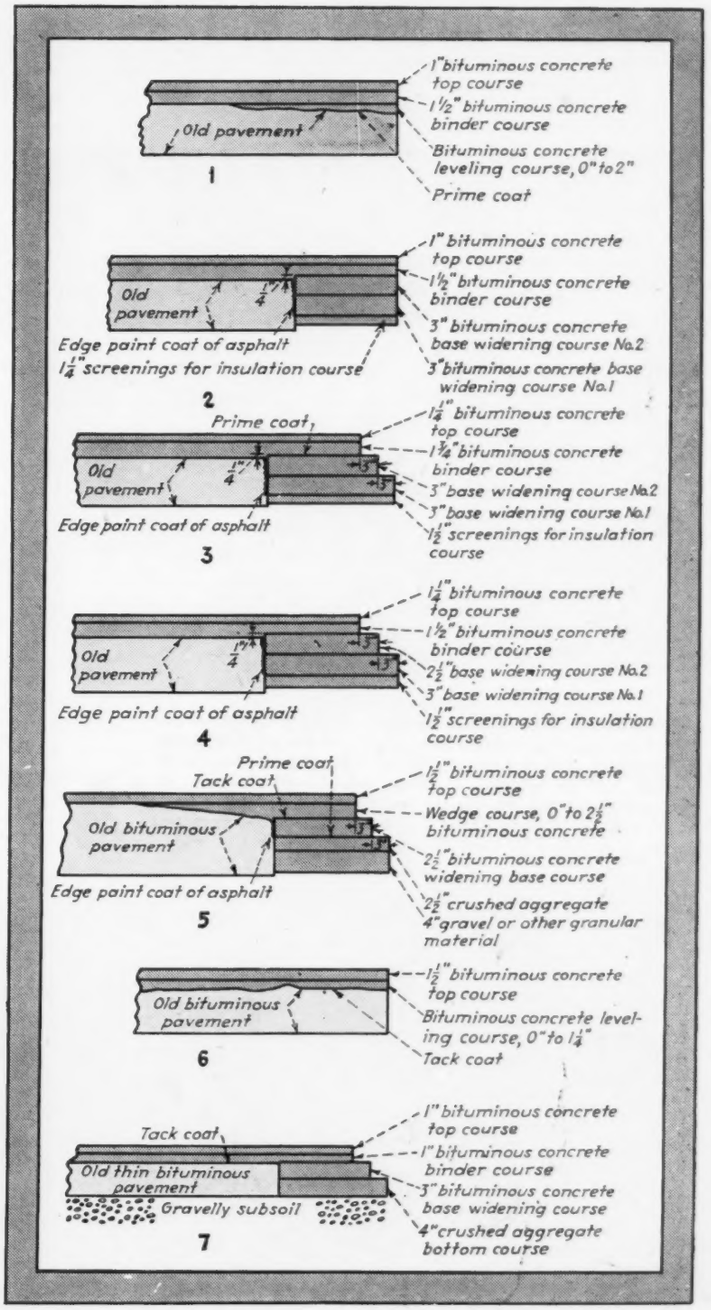
pavement. Long experience in salvaging existing pavement has developed in a number of organizations efficient techniques and practices which have become more or less standard.

Adaptable Materials

Various types of paving materials can be used satisfactorily for resurfacing. Among the acceptable materials, plant-mixed asphaltic concrete is outstanding because it possesses many characteristics which make it peculiarly adaptable to this class of work. Its relatively low cost, ease of laying by machine to a smooth riding surface and precise methods of proportioning and compacting in a wearing course which will resist the destructive action of the severest traffic have

EXCAVATION FOR FRENCH DRAIN, indicated by arrow, through earth shoulder of highway provides outlet both for water which may collect in trench during construction and for water which may later find its way under pavement. Badly broken slab is evidence of need for better drainage.




1
1" bituminous concrete top course
1½" bituminous concrete binder course
Bituminous concrete leveling course, 0" to 2"
Prime coat
Old pavement
2
1" bituminous concrete top course
1½" bituminous concrete binder course
3" bituminous concrete base widening course No.2
3" bituminous concrete base widening course No.1
Edge paint coat of asphalt
¼" screenings for insulation course
Old pavement
3
1¼" bituminous concrete top course
1¾" bituminous concrete binder course
3" base widening course No.2
3" base widening course No.1
½" screenings for insulation course
Prime coat
Edge paint coat of asphalt
Old pavement
4
1¼" bituminous concrete top course
1½" bituminous concrete binder course
2½" base widening course No.2
3" base widening course No.1
½" screenings for insulation course
Edge paint coat of asphalt
Old pavement
5
1½" bituminous concrete top course
Wedge course, 0" to 2½" bituminous concrete
2½" bituminous concrete widening base course
2½" crushed aggregate 4" gravel or other granular material
Prime coat
Tack coat
Edge paint coat of asphalt
Old bituminous pavement
6
1½" bituminous concrete top course
Bituminous concrete leveling course, 0" to 1¼"
Tack coat
Old bituminous pavement
7
1" bituminous concrete top course
1" bituminous concrete binder course
3" bituminous concrete base widening course
4" crushed aggregate bottom course
Tack coat
Old thin bituminous pavement
Gravelly subsoil

led to rapid advance in the use of plant-mixed asphaltic concrete during the last ten years. Placed in two or more layers, asphaltic concrete makes a waterproof cover which protects the base from surface water penetration. The material also is readily adapted to widening an old road which is to serve as a base for a new top.

Methods which have proved effective and economical in widening and resurfacing with plant-mixed asphaltic concrete are discussed in the following article. Although the article is not intended to cover use of asphalt in surface treatment and roadmix work on secondary highways, it should be stated that these low-cost types, when they have to be strengthened to accommodate increased traffic, respond just as readily to resurfacing with plant mix as do the higher type pavements.

SPECIALLY DESIGNED BLADE mounted behind three scarifier teeth on motor grader cuts trench for widening alongside old pavement.

← **INSULATION COURSE** 1½ in. thick of screenings is compacted on subgrade of pavement widening strip with trench roller. Note French drain, marked by arrow, which will furnish outlet for any water trapped in widening strip or under old pavement.

Preparing Old Pavement

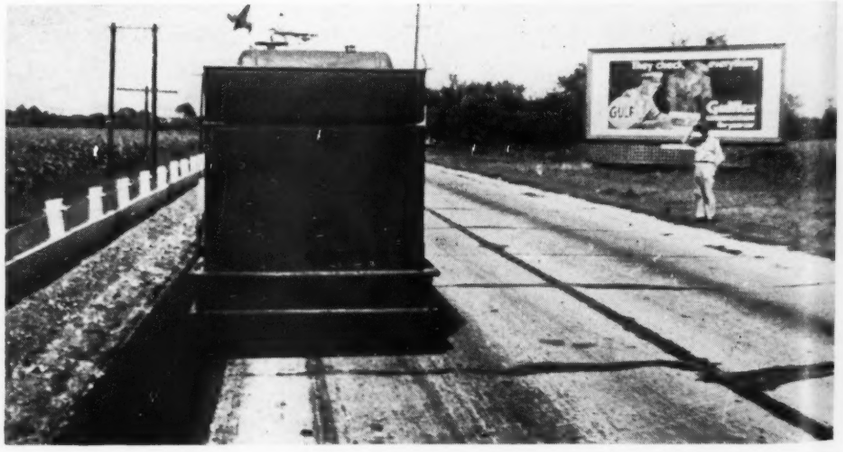
Proper preparation of the old pavement to put it into condition for resurfacing is an essential prerequisite to a dependable, trouble-free job. Proper preparation involves patching, sealing, eliminating long undulations and leveling a rough surface, where required.

Patching—Where it is needed, patching is the first step in reconditioning the old pavement prior to resurfacing. For flexible types of pavement, patches should be built up of courses of aggregate and of bituminous mixtures. Frequently rigid types can be patched most economically with the same materials. Sound, solid patches placed in the past can be left undisturbed.

New breaks and defective areas which are loose or which lack solid foundations should be cut out several inches deeper than the old base and replaced with well tamped aggregate deposited in layers, each layer properly filled with fines or screenings in accordance with recommended practice for building new base courses. For every patch, at least one layer of bituminous concrete or bituminous-

GRAVITY SPREADER BOX (below) specially designed for this work spreads second 3-in. course of hot mix in trench without use of side forms. Sufficient quantity of material is deposited to leave finished compacted surface about ¼ in. above edge of old pavement. Spreader box and truck feeding into it ride entirely on old pavement. Screw-feed spreader boxes now being developed will spread up to 4-ft. width.

TO PREVENT HOT MIX (below) from spreading out on to old surface and thus interfering with proper compaction, operator on first pass employs "pinch" rolling of second 3-in. base course, allowing roller wheel to cover about 4-in. width of plant mix. This widening is being constructed without edge forms.



coated aggregate should be placed on the surface.

On clay subsoil the raw earth should be covered with 1 to 2 in. of stone or slag screenings as an insulation course against penetration of fine soil into the base courses, placed on top of the screenings.

Bituminous concrete or some form of bituminous-coated aggregate may prove economical for construction of all base courses, as these materials minimize likelihood of future settlement, in comparison with uncoated aggregate. Many highway departments prefer hot mix for this patching operation, particularly when resurfacing is to follow immediately, as the hot mix compacts promptly to great density, reducing the possibility of any later settlement.

Cold-Mix Patches

To obtain the benefit of additional compaction under traffic, it is desirable that patching be done as far as possible in advance of resurfacing. If patches can remain exposed for sufficient time to be consolidated by traffic, some cold-mixed materials may prove satisfactory and less expensive, as it is not always possible to obtain hot mixtures in small quantities. If cold mix is used to make a patch, sufficient time for each layer to harden should intervene before the next layer is placed; otherwise trapped distillates or moisture may cause instability of the patch for some time. Where it is not practical to delay for this curing, a 2-in. course of about 1½-in. size uncoated crushed stone may be placed between layers of amiesite-type cold mix. This expedient has given satisfactory results in a number of places.

Regardless of the grade of material used, it should be placed in comparatively thin layers, a maximum of 3 in. for base and 2 in. for top courses, and these layers should be well compacted. Where small areas do not permit rolling, it is desirable to use pneumatic tampers to obtain good compaction unless the patch or patches are to be under traffic for some months before the resurfacing is placed. A bituminous patch should be finished slightly higher, about ¼ in., than the surrounding pavement to allow for compression and assure better final compaction of the patching mixture with a roller. Where portland-cement concrete patches are used in old concrete and brick pavement, the patches should be cured a sufficient length of time before resurfacing to permit traffic to roll over the patches without injury to them.

PAVED SHALLOW GUTTER, consisting of layer of crushed stone topped by 2½ in. of asphaltic concrete placed when street was being resurfaced, takes care of surface drainage and provides clean, safe place to park cars in this small town.

Pavements Used as Bases

Old portland-cement concrete and brick pavements on soils which are fairly well drained, particularly if good side-ditch drainage prevails, make excellent bases for resurfacing with bituminous concrete,

(Continued on page 146)

NARROW WIDENING STRIP is consolidated by trench roller, used to compact subgrade and all courses in trench.

TRENCH ROLLER (below) can operate in any width of widening strip within its gage limits. Pilot wheel, riding on old pavement, is adjustable to fit various depths. This widening strip is being constructed with aid of forms.

EMULSIFIED ASPHALT (below) is sprayed on edge of existing pavement for purpose of cementing widened base to old pavement.

Sure

c-footed!

• Downhill or up . . . turns or straightaway, Oliver "Cletrac" crawler tractors have a sure-footed grip. Even when taking a heavy load downhill, they don't zigzag. Power is never disconnected from either track . . . both tracks keep working all the time to assure perfect control, even on turns.

This sure-footed grip, which assures greater safety on hills and turns, is found only on Oliver "Cletracs." For only Oliver "Cletrac" gives you *controlled differential steering* . . . the exclusive feature that eliminates "declutching" or "braking" on turns . . . that enables Oliver "Cletracs" to steer the same going downhill with a heavy load as up. There is no need for the operator to "cross over" on the controls and steer in the opposite direction as is necessary on the ordinary tractor.

These sure-footed tractors are unusually accessible, making maintenance a simple task. They are ruggedly built for long life and greater resistance to the shocks, strains and twists of tractor service.

Substantial numbers of Oliver "Cletrac" tractors are now being released for essential use. Your Cletrac dealer will gladly assist you in making application for a new tractor. **The OLIVER Corporation,** Industrial Division, 19300 Euclid Avenue, Cleveland, Ohio.

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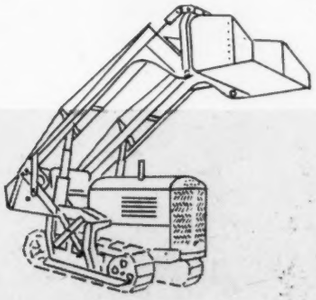
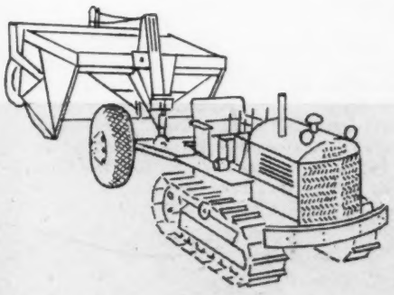
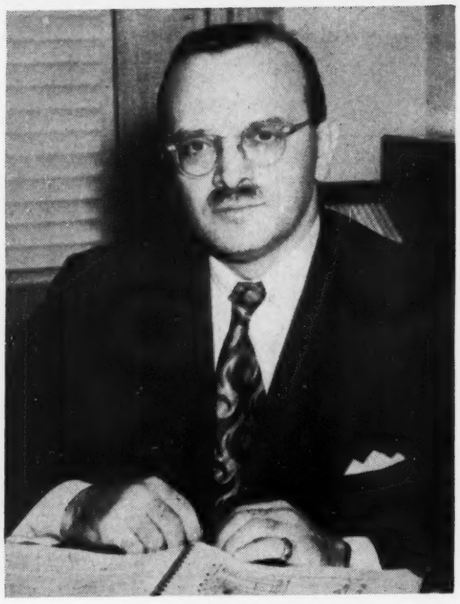




THE OLIVER CORPORATION

Present and Accounted For... A PAGE OF PERSONALITIES



KAISER ENGINEERS has been organized as permanent group, with headquarters in Oakland, Calif., to undertake engineering and construction work in any part of world. It is headed by **HENRY J. KAISER** (left), president; **GEORGE HAVAS** (center), vice-president and general manager; and **GEORGE W. VREELAND** (right), chief consulting engineer.

ON MISSION TO UNITED STATES to obtain hydroelectric equipment for reconstruction of Dnieprostroi Dam and power plant on Dnieper River are four leading Russian engineers. Pictured are (left to right, front row): **A. V. NATANSON**, hydroelectric engineer; **I. S. LOCKE**, International General Electric Co., who acted as interpreter; **M. D. KOZLOV**, electrical engineer; (back row) **J. F. SPEASE**, Northwest district engineer, General Electric Co.; **A. R. KUDIRSKY**, electrical engineer; and **N. SHPIAKIN**, hydraulic engineer.

ELECTED PRESIDENT of Western Association of State Highway Officials is **W. H. LYNCH**, division engineer, Public Roads Administration. Stationed in Portland, Ore., he is in charge of highway work in Montana, Oregon and Washington.

NEW PRESIDENT of Associated General Contractors of America is **HARRY A. DICK** (left), president, Gilpin Construction Co., Portland, Ore. He is vice-president of General Construction Co. and vice-president of Oregon Shipbuilding Corp. Succeeding Mr. Dick as A.G.C. vice-president is **WARREN S. BELLOWS** (right), president, W. S. Bellows Construction Co., of Houston, Tex.

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WIRE ROPE

Precisionbilt to Protect Life • Equipment • Operations • Periscopes are built with precision. So is J&L Wire Rope. Safety of human life . . . protection of equipment . . . maintenance of operations . . . depend on the quality of the wire rope you use. To give you the greatest protection . . . J&L builds wire rope with precision . . . from J&L Controlled Quality Steel . . . by men of skill and experience . . . on machines of the latest design . . . and pre-forms it for greater efficiency and resistance to fatigue.

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LEGAL ADVENTURES of TRACTOR CONN

By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Vermont Injunction

Doe sold a piece of land to Roe and Roe sold it to Poe. Poe arranged with Tractor Conn to build a 10-story building on the land. The contract was signed and Conn began work in good faith and with commendable energy.

When the building was half completed, Doe returned from the Coast and notified Conn to stop work.

"When I sold the land to Roe, he covenanted and agreed that no building higher than 5 stories would be erected on the land. When Poe bought the land he became bound by the same conditions," Doe pointed out.

"That's a matter that you and Poe will have to fight out between you. I'll have to ask you to excuse me, as the concrete foreman is waiting for instructions," Conn told him.

Doe consulted his lawyer, the lawyer obtained an injunction, the injunction was duly served, and Tractor Conn was forced to cease work.

"It'll be a big loss to you," Poe averred.

"I haven't been to my lawyer yet, but it's my impression that when I'm prevented from completing the work by something beyond my control and for which I am not responsible, I am entitled at least to pay for the work I have done at the contract rate," was Conn's answer.

"Well, you'll have to sue me before you get it," was Poe's ultimatum. Tractor Conn sued and the Vermont Supreme Court ruled in his favor in the case of Doolittle vs Nash, 48, Vt. 441.

The Case of the City Bonds

Tractor Conn submitted the low bid on a certain public work.

"You will get the contract, provided that the bonds which we are selling to pay for this work sell for at least 90, which is the lowest rate at which we can lawfully sell them," the city agreed. Tractor Conn walked down the street and called on a bond dealer.

"If the city can sell their bonds for at least 90, I get my contract. There's a good profit in it, so if you'll bid 90 I'll pay you 5 percent of the total amount of the bonds," Conn proposed.

"Suits me," the dealer agreed and put in a bid for the bonds at 90. Another dealer bid 91 and got the bonds. Then the bond dealer sued Conn for the 5 percent which he had agreed to pay.

"Such an agreement is illegal and void," Conn argued, but the United States Circuit Court of Appeals ruled in favor of the bond dealer on this point, in a case reported in 299, Federal Reporter, 279.

"Nor does it make any difference that the dealer did not purchase the bonds. Conn's intention was that they would be sold at a price authorized by law, which was the whole purpose of the contract," was the reasoning of the Court.

The Case of the Washington Rents

An owner in Washington state had a building which needed repairs. Tractor Conn contracted to do the work and it was agreed that the repairs were "to be paid for in rents received from tenants who may occupy the building." As soon as this contract was signed Conn made the necessary repairs and collected the rents for a certain time, but not long enough to reimburse himself for the cost of the repairs. Then the owner claimed that Tractor Conn was not entitled to any further rents.

"You were entitled to a reasonable time and no longer in which to reimburse yourself from the rents," the owner argued.

"The contract is silent as to time," Conn pointed out.

"That's just the point," the owner retorted. "The general rule is that whenever a contract specifies that a certain thing is to be done but names no limit, it is understood that it must be done within a reasonable time."

The Washington Supreme Court, however, in the case of Burke vs Campbell, 224 Pacific Reporter, 9, ruled in favor of Tractor Conn.

"While the agreement is an unusual one, it is not uncertain in its terms, and we must enforce it as we find it. Manifestly, it was the intention of the parties that the contractor should be paid out of the rents, and, if so, then he has a right thereto, until he has been fully paid, regardless of the lapse of time, provided, of course, he has performed his duty of trying to rent the property," said the Court.

More Legal Adventures of Tractor Conn Next Month

the Job— Placing 600,000 sq. yd. of black top pavement in 80 working days

LAYING the binder and top courses on twenty-five miles of two-lane roads and a lesser mileage of secondary roads in one of the new naval training stations is another of the rush jobs completed in record time by Adnun Black Top Pavers.

These machines showed their dependability by staying on the job 20 hours a day, seven days a week until the first part of the pavement had been completed and then to speed up construction, the day was lengthened to 12 hours. Here, too, was a typical example of their versatility—each machine laying either the thick binder course or the thin top course with the width and depth controlled to meet every specification. Continuous course correction, an exclusive feature of Adnun, automatically corrected hollows and bumps with each successive course, reducing all irregularities to insignificance.

With an Adnun you can build highways and airports with the minimum of subgrade preparation, with tight joints between strips, maximum density, smoother finished surface and added leather durability. Write today for details or see your Foote distributor.

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ADNUN
TRADE MARK REGISTERED
BLACK TOP PAVER
WITH CONTINUOUS COURSE CORRECTION

Army Crane in France

Loaded in Close Quarters and Moved by Tank Recovery Unit

1 BECAUSE OF CLOSE QUARTERS in railroad yards at Bar-le-Duc, M-26 tank-recovery unit is having some difficulty in maneuvering around close enough to loading platform so that Lorain crane can be loaded. To speed operation, crane lifts back of trailer of TR unit and swings it around to align it with platform.

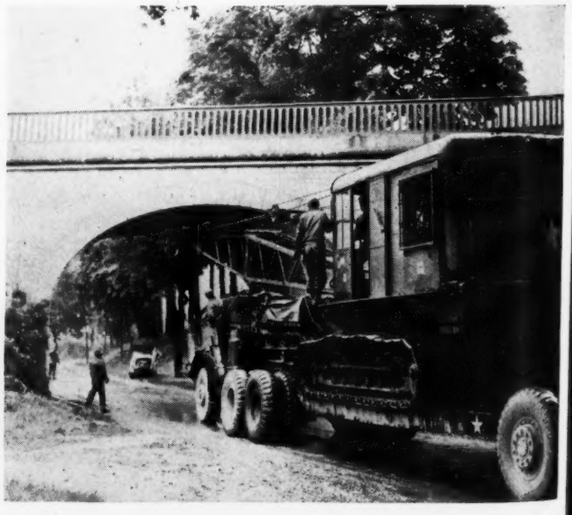
THE ACCOMPANYING PHOTOGRAPHS from Waldo G. Bowman, war correspondent with the U. S. Army in France, show, in step-by-step sequence, how a Lorain crawler crane was loaded on an Army tank recovery unit in the railroad yards at Bar-le-Duc and hauled over French highways to Pompey, the point at which it was needed.

2 AS TREADS of the crane are too wide and weight too much for rear wheels of M-26 trailer, crane has to be loaded on trailer from side. Heavy wood planking has been used to level bed of platform to that of trailer. Here is crane starting to walk on trailer.

3 CRANE IS FULLY LOADED on M-26 unit, ready to hit road. It has been anchored to bed of trailer by heavy chains and turnbuckles.

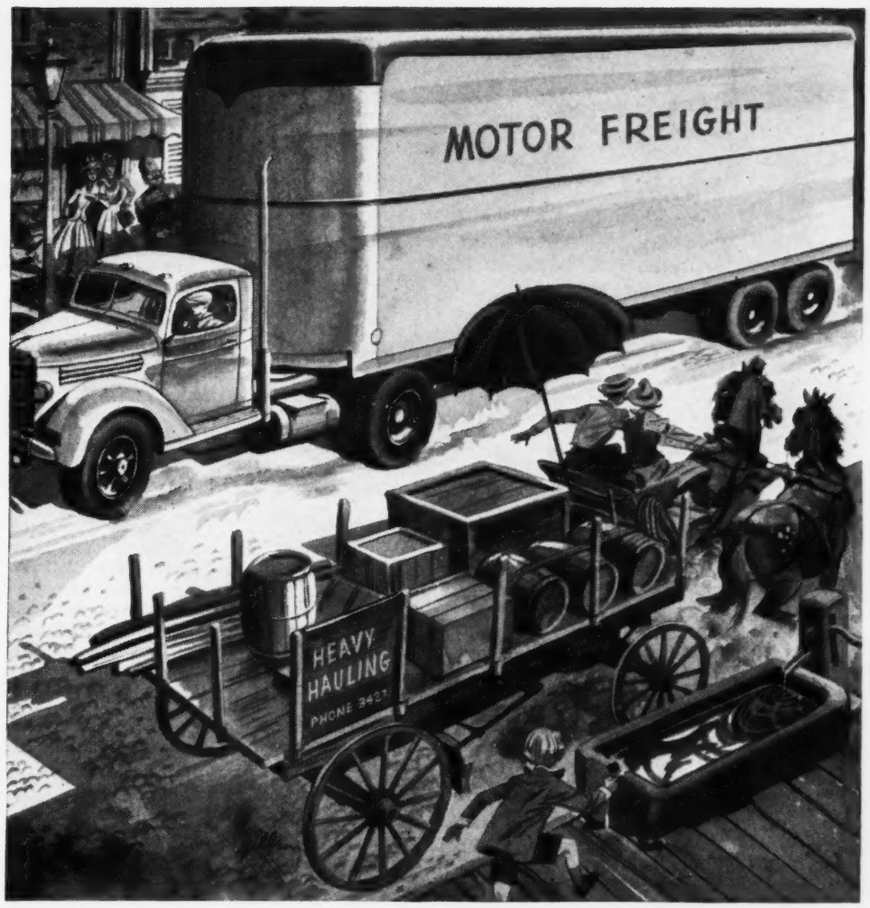
4 EVEN WITH BOOM LOWERED crane encountered some difficulty with low overhead wires on bend in road in little town called Bronville-en-Barrois.

5 ARCHWAYS are beautiful to civilians, but here at Ligny-en-Barrois they raise hob with Engineers when they try to move equipment as big as Lorain crane.



6 BRIDGES IN FRANCE just were not built to accommodate such large equipment as Americans have brought over. This railroad bridge near Void was just 6 in. higher than long boom of crane.

7 WHEN CRANE ARRIVED on job, problem of unloading had to be solved. This question was simply met by having Caterpillar D-8 bulldozer build ramp of dirt up to edge of M-26 trailer and walking crane off of side at Pompey, France.



There's been a big change

★ "Heavy hauling" has shown amazing progress since the days of the horse-drawn dray.

Tapered roller bearings have advanced, too. The most notable improvement was made when Tyson developed the "all rolls" design . . . added 30% more load-carrying rollers around the raceway.

Though interchangeable with other tapered roller bearings, Tyson carries greater loads . . . has maximum rigidity . . . *lasts almost twice as long.* For every heavy-duty job, depend on Tyson.

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TODAY'S HEAVY-DUTY BEARING

★ BUY AND KEEP WAR BONDS ★

FAVORITE
Reversible
RATCHET WRENCH

THE ONLY WRENCH WITH ALL THESE FEATURES . .

- Each head fits two different sizes of nuts
- Positive, instantly reversible ratchet action
- Can be used over long studs
- Does not chew nuts
- Operates in narrow spaces
- Tightens nuts quicker
- Cannot slip off nuts

Three sizes of handles . . . each handle takes five different heads . . . each head fits two different size nuts. Write for circular and prices. Carried by leading mill supply houses.

PROMPT SHIPMENT assured by large manufacturing facilities. Made by the makers of PALMETTO and other self-lubricating packing.

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CONSTRUCTION EQUIPMENT NEWS

APRIL, 1945 REVIEW of Construction Machinery and Materials

ELECTRODE HOLDER, designed to increase the usable portion of the electrode to a point right up to the uncoated end of the rod, to allow unobstructed visibility while welding, and maximum accessibility even for deep pocket work, fast loading and reloading, is completely insulated,

loads and unloads in a second and because of perfect balance and light weight, according to its manufacturers, minimizes operator fatigue. With the "Shortstub" holder, only one-half inch is needed for a tight, efficient current contact in the holder jaw. Extension of holder itself allows usable stub end of the rod to be projected into proper position for welding.—**National Cylinder Gas Co., 205 W. Wacker Drive, Chicago 6, Ill.**

★ ★ ★

OIL CONCENTRATE when added to or blended with any good grade of oil in correct proportion is said by its manufacturer to produce a super-lubricant for all types of internal combustion engines such as steam and gas engines, turbines, air compressors, truck engines and vacuum pumps. It mixes thoroughly with any type of lubricating oil, will not settle out or segregate and cannot be extracted by any filter. Prevents formation of hard carbon on valves and rings when used in air compressors and internal combustion engines. Gives better spreading or wetting action to lubricant treated and penetrates pores of metal giving instant lubrication. Also because of its wetting ability and heat-resisting properties, it is recommended to cut the feed of oil on air compressors. Claimed to reduce oil consumption in combustion engines. Manufacturer recommends one part of Gibraltar oil concentrate to eight parts of regular lubricating oil.—**The Hood Refining Co., 157 N. Hamilton Ave., Greensburg, Pa.**

★ ★ ★

SELF-PROPELLED 20-TON CRANE, whose carrier as well as turntable is powered by turntable engine, is designed for use wherever unlimited, unrestricted mobility and general crane versatility can be used to reduce costs of material handling. Power to propel unit is drawn from engine on crane revolving turntable and transferred to carrier through an auxiliary travel shaft and center pin which are roller- or ball-bearing mounted throughout. Two-speed transmission on turntable and transfer case on chassis permits four travel speeds forward or reverse ranging from 1 to 7 mph. Maximum grade of 20 percent can be climbed by unit in low gear. Final drive is by two rear worm-driven Timken axles arranged in tandem and connected by a through drive which divides engine power equally between two driven axles. Full floating shafts and parallel torque

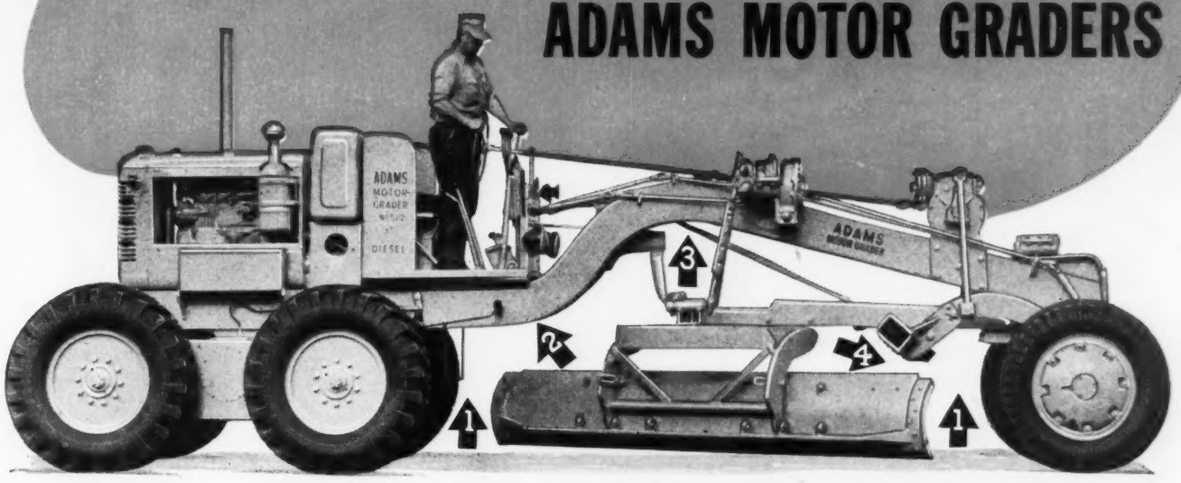
rod system are incorporated in design. Two rear axles are mounted on rocker arms which replace conventional springs, providing required flexibility for road travel and necessary rigidity for crane operation. Steering is effected by positive application of air controlled by single hand lever in cab. Bendix Westinghouse air brakes standard equipment on all four rear wheels. Disk-type parking brake mounted directly on drive shaft.

(Continued on page 98)

PLENTY OF BLADE CLEARANCE!

IN ALL OPERATING POSITIONS WITH

ADAMS MOTOR GRADERS



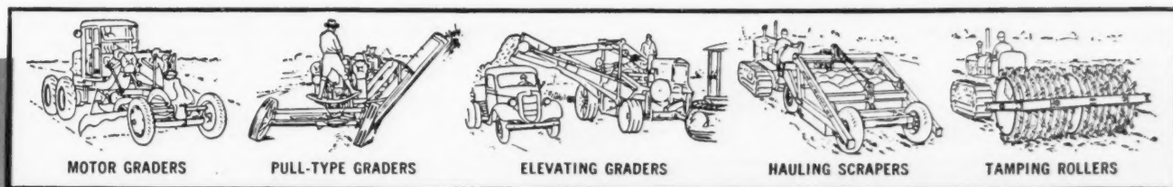
Action photo of ditching operation showing how wide blade end and scarifier clearances speed free movement of dirt.

WIDE BLADE clearance—in all operating positions—is an inherent advantage in all Adams Motor Graders. Note in photo above how Adams' advanced design provides generous clearances at these critical points:

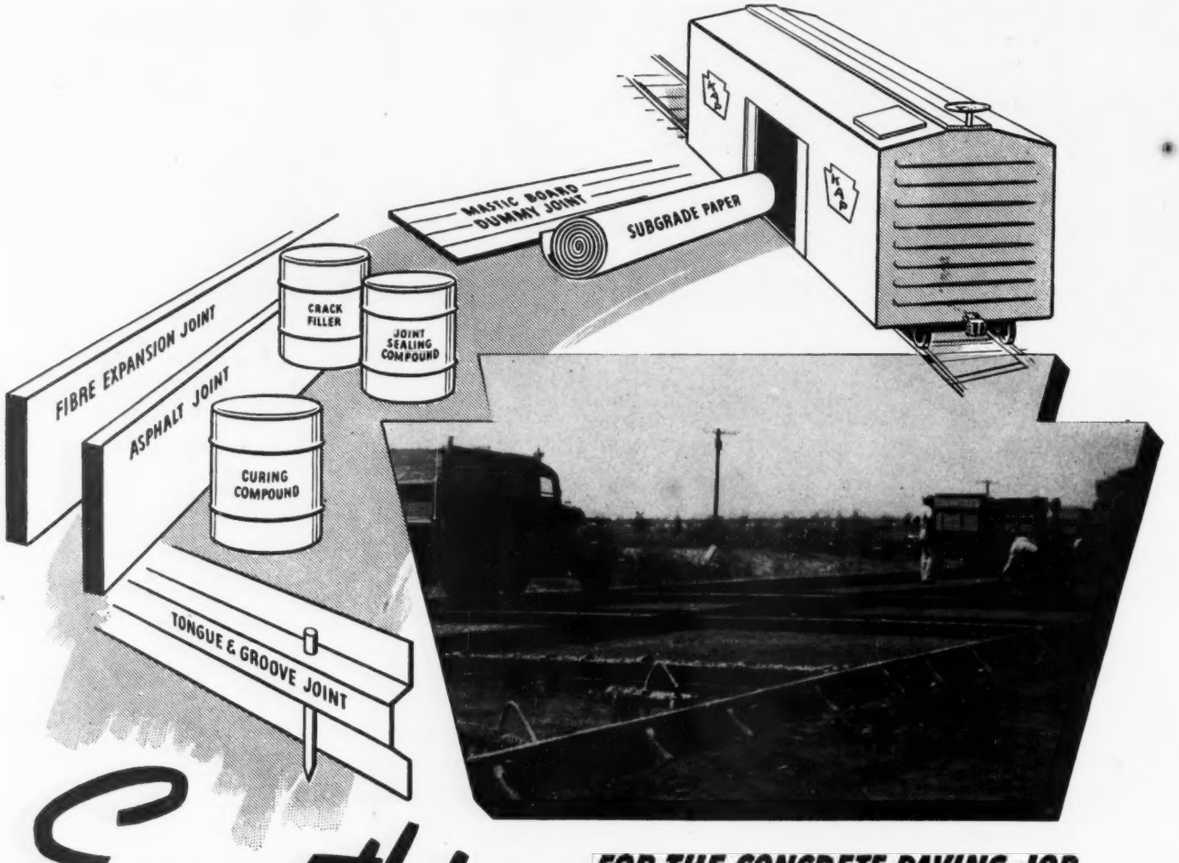
1. Between blade ends and tires, permitting sharp blade angles without tire interference.
2. Between blade and frame for free movement of heel.
3. Between blade and frame arch, permitting higher blade lift for ground clearances.
4. Between blade and scarifier block for easy reversing of blade under scarifier.

Thus, operators may maneuver blade into widest range of positions, without interference with wheels, frame or scarifier—promoting efficient, high-speed production. Ask your local dealer for the full story about Adams Motor Graders and their many job applications.

J. D. ADAMS MANUFACTURING CO.
INDIANAPOLIS, INDIANA
Sales and Service Throughout the World



ADAMS ☆ ROAD-BUILDING AND ☆ EARTH-MOVING EQUIPMENT



Everything FOR THE CONCRETE PAVING JOB FROM ONE SOURCE

YOU'LL save time, money, bookwork and a lot of "headaches" if you let Keystone supply everything you need for your concrete paving jobs. Keystone's line—complete except for the sand, gravel and cement—makes it possible for you to obtain all your requirements from one source. That means no costly delays caused by failure of some vital material to arrive, easier handling, lower freight costs and better all-around service. Keystone Paving Products meet Federal and State specifications, have been proved on the job thruout the country, and represent the latest practical thinking of leading highway engineers.

Keystone Tongue and Groove Joint—used transversally and longitudinally gives maximum load efficiency. Distributes the load without cracking.

Keystone Asphalt Mastic Board Dummy Joints—for true, straight alignment without expensive installing machinery. Waterproof, rigid, easy to handle, low in cost.

Kapco Curing Compound—easy to apply, membrane type, transparent liquid that retains maximum amount of mixing water. Adheres to wet surface, does not crack or shrink.

Other "Road Tested" Keystone Products—Joint Sealing Compound, Crack Fillers, Subgrade Papers, Sewer Pipe Joint Compounds, Fibre and Asphalt Expansion Joint, Waterproofings.

Send for illustrated catalog, price list and details of Keystone's Complete Service.

Keystone KAP **ASPHALT PRODUCTS CO.**
A DIVISION OF AMERICAN-MARIETTA CO.

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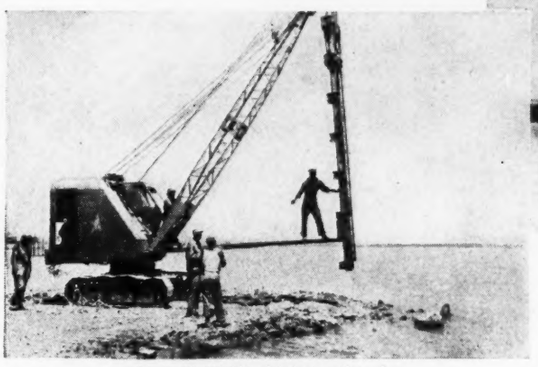
43 E. OHIO STREET · CHICAGO 11, ILL.
MANUFACTURING PLANT · CHICAGO HEIGHTS, ILL.

PREMOULDED ASPHALT AND FIBRE EXPANSION JOINTS AND ACCESSORIES. JOINT SEALING COMPOUNDS AND CRACK FILLERS

JACK OF ALL JOBS—

in heavy materials handling

Above—Vital supplies and equipment being unloaded by a "Fighting Osgood Mobilcrane" in the South Pacific.



Osgood "20" driving piles for a landing pier in North Africa.

Helping to clear the way to Berlin and Victory, "Fighting Osgoods" serve under fire with Army Engineers in Europe, as well as on other battle fronts.

"FIGHTING OSGOODS" LIFT, DIG AND DRIVE IN THE BATTLE OF SUPPLY

When the engineer troops and SeaBees "go in" on the heels of our attacking forces, they need the right equipment to do a multitude of jobs quickly and efficiently. Roads and air fields must be leveled, loading docks built, supplies loaded and unloaded, rubble cleared away fast.

Osgood shovels and cranes figure dependably in all these operations . . . working as crane, pile driver and shovel. They're engineered with the power, stamina and versatility to keep precision planning and production on schedule. You'll appreciate these advantages when *your* planning goes into action after Victory.

WHEN IT'S WAR BONDS, BUY MORE THAN BEFORE!

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
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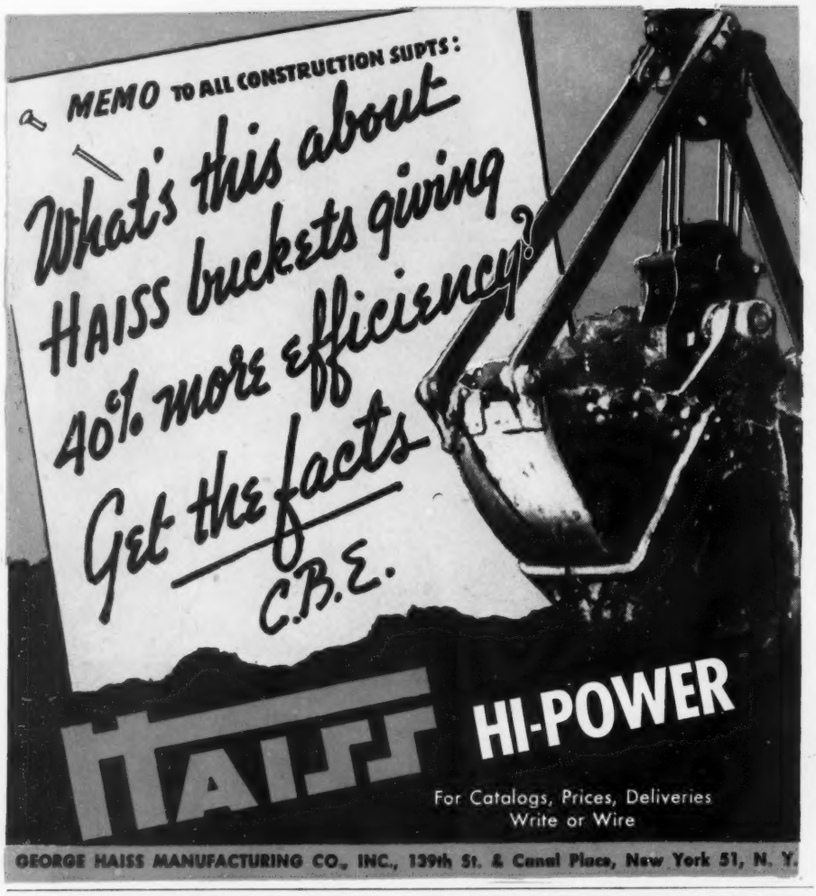
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What's this about HAISS buckets giving 40% more efficiency?
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ORIGINAL SCHINCK *Automatic* TRACTOR LOADER

Attaches TO ANY TRICYCLE TRACTOR

With **PATENTED "PERFECTION" DUMP CONTROL**

Tackles the work of ten men!—Does the job faster, cheaper! Saves dollars and precious man hours!

Loads sand, gravel or dirt at rate of 40 to 60 yards an hour! Used **also** for scraping, leveling, grading! No idle time with this ever-useful, much-needed equipment. Its ease and speed of operation, even in close quarters, make it a real time and money saver in every type of road or construction work.

THE LOW COST LOADER THAT HANDLES BIG JOBS!

Big ½ yard scoop handles 1500 to 2000 pounds of gravel, sand or dirt per scoop . . . does it **easily, smoothly.** Lifts load 8 feet. Dumps load at any height. Positive action from power take-off! Operator has perfect control. Unit built to give a lifetime of service-free operation. Dependability, economy and satisfaction proved on hundreds of big construction and maintenance jobs.

NOW AVAILABLE . . . A limited number of these famous loaders available for the first time in two years. Write for illustrated literature and prices.

Automatic **EQUIPMENT MFG. CO.**
501 MAIN ST. . . . . . *Pender, Nebr.*

Now **STANDARD EQUIPMENT for ROAD BUILDERS and CONTRACTORS**

HERE ARE JUST A FEW BIG USERS:

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Grand Island, Nebr.
PETER KIEWITT & SONS
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JOHN KELLY CONST. CO.
Fairbanks, Ind.
STATE OF NEBRASKA, DEPT. OF ROADS AND IRRIGATION
SAND ORE CONST. CO.
McPherson, Kans.

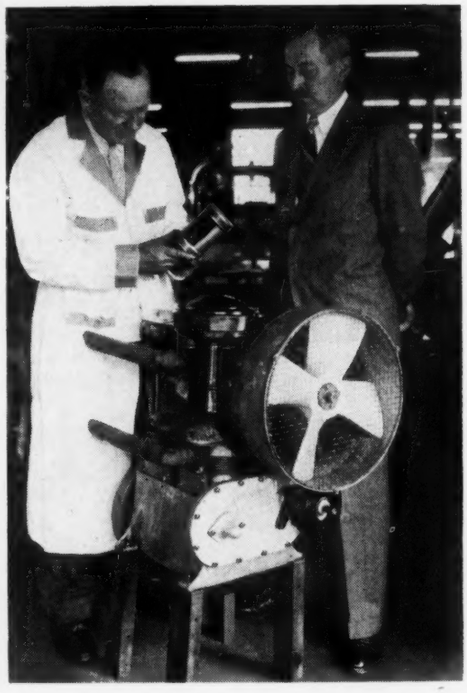
You Too Should Have an Automatic on the Job on EVERY LOCATION!

(Continued from page 94)

All-welded steel boom is pin-connected to permit easy and quick insertion of center sections for longer booms. Straight or gooseneck tip extensions available. Additional features: loading platform on front of carrier, two telescopic style outriggers with floats, automotive style night lights on superstructure, head, parking, stop and tail lights, four-clearance lights, electric horn, tow hooks at front of carrier, complete set of instruments and tools, hose for tire inflation operated from special outlet at air tank. Mounted on six wheels each equipped with dual 11x20-in. rubber tires. One-man operated.—**The Thew Shovel Co., Lorain, Ohio.**

★ ★ ★

WEIGHT- AND SPACE-SAVING AUXILIARY ENGINE weighing only 5.1 lb. per horsepower and developing 32 hp. at 2,200 rpm. on two cylinders, utilizes double-acting principle whereby power is applied to both sides of piston instead of to but one as in conventional four cylinder engines. These savings are made possible by successful cooling accomplished by drawing off one-third of excess heat from inside of the cylinder in addition to normal cooling by conventional fins on out-



side. Engine's crosshead, which takes all angular thrust, consists of a wrist pin mounted at each end in ball bearings and attached to the piston rod. Ball bearings run between two hardened steel self-aligning guides of 0.003-0.005-in. clearance which simplify assembly procedure and maintain even pressures in operation. Two crosshead shifts take place in each cylinder during the full cycle, one at the end of the second power stroke and the other between compression and the first power stroke, the latter occurring at the moment the horizontal component of the power stroke set up by the angularity of the connecting rod is sufficient to overcome the inertia of the moving parts involved. Designed to use 68-72 octant gasoline, the engine consumes .54 lb. per hp. hour at maximum rated horsepower. Height, 26 in.; width, 21 in.; length, 26 in.—**The Tabor Manufacturing Co., 6225 Tacony St., Philadelphia, Pa.**

HEIL Hi-Speed Cable Scoops

give you fast, profitable dirt-moving at low cost

This Heil unit picks up heaped 15-yard loads like this one — in 40 to 50 seconds.

You can travel to the fill at speeds up to 20 M.P.H. 5-speed transmission gives you easy shifting, fast acceleration.

This Heil unit spreads load evenly and quickly by means of a positive, mechanical tilting-floor push-out action.

Here is a perfectly matched, high-speed dirt-moving unit that consists of a 150 H.P. Heil Rubber-Tired Tractor and a 15-yard Heil Cable-Operated Scoop. It combines proved efficiency with speed, economy, and flexibility—to help you move more yardage faster and cheaper.

These units have been thoroughly job-tested on a variety of earth-moving projects and under all types of operating conditions. Experience proves that: (1) You get fast acceleration even with heaping loads. (2) You cut round-trip time and secure top operating efficiency, particularly on long hauls. (3) You get a fast, positive discharge by a leverage action that exerts a *low line-pull* on the unloading cable.

These are a few of the reasons why Heil Hi-Speed Cable Scoops have gained such widespread acceptance throughout the dirt-moving industry. You can profit by the example of other successful dirt movers by adding these efficient Heil units to your equipment. *Write for bulletins or —*

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

R-46

ARMY NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Manganese Steel "*Glove*" Protects Business End of Dredge Dipper Stick

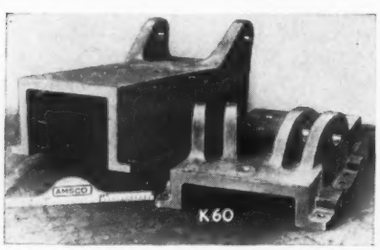
The dipper sticks on dredges are usually subjected to abusive service. They receive many violent impact shocks from submerged rocks and logs, and also come in contact with abrasive materials such as gravel.

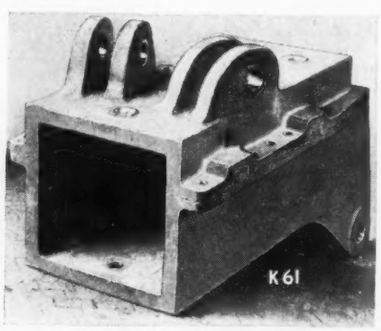
During the past thirty years, Amsco has on a number of occasions been called upon to furnish socket castings designed to fit over the end of a dredge dipper stick. Austenitic manganese steel has the toughness to resist the impacts and stresses inevitable in this work, and at the same time is incomparably the best metal for withstanding the abrasive action of the material being dredged.

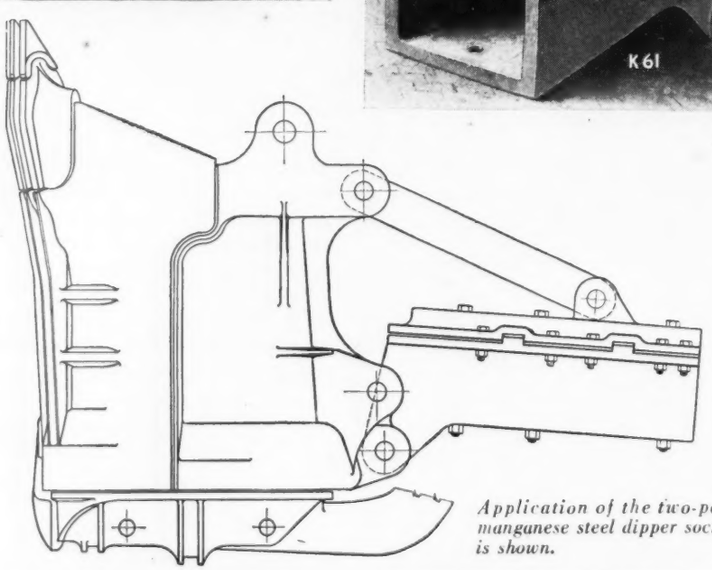
A two-part manganese steel socket is shown in Pictures K-60, K-61 and the accompanying sketch. Two of these units were recently made for a dredging company; the larger weighing 11,000 lbs. and the other 7,300 lbs.

The dipper is attached to this socket casting, as shown, which is bolted to the stick by means of the cored holes shown in the top and bottom section of the socket.

This is just one of many manganese steel units which have proved their worth on dredges of all types. Our recent bulletin, No. 844-D, entitled "Amsco Manganese Steel—The Toughest Steel Known—For All Dredging Purposes", pictures these applications as well as Amsco dredge pumps and shows some of the dredges on which they are used.







Application of the two-part manganese steel dipper socket is shown.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
AMERICAN Brake Shoe COMPANY
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

LIGHTWEIGHT DC WELDER, designed for quick, easy portability and for use in cramped quarters aboard ships, weighs one-third less and has one-third greater capacity than conventional models. New dc. to dc. 200-amp. welder weighs 333 lb.;

conventional welder, 150-amp. capacity weighs 500 lb. Older machine was driven by ac. current motor which weighs less than dc. motor of lightweight set. Saving in weight has been achieved without any basic change in form of construction, steel being used for all structural parts. Weight reduction for most part comes from improved ventilating system in which underside of core is well ventilated. Skid mounted. Handrail surrounds set so it can be picked up by four men and carried where needed.—**Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.**

Shunk
Superior Quality
BLADES
AND CUTTING EDGES

For any make of machine
Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls, Also—

CUTTING EDGES
WEARING BOOTS
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCARIFIER TEETH

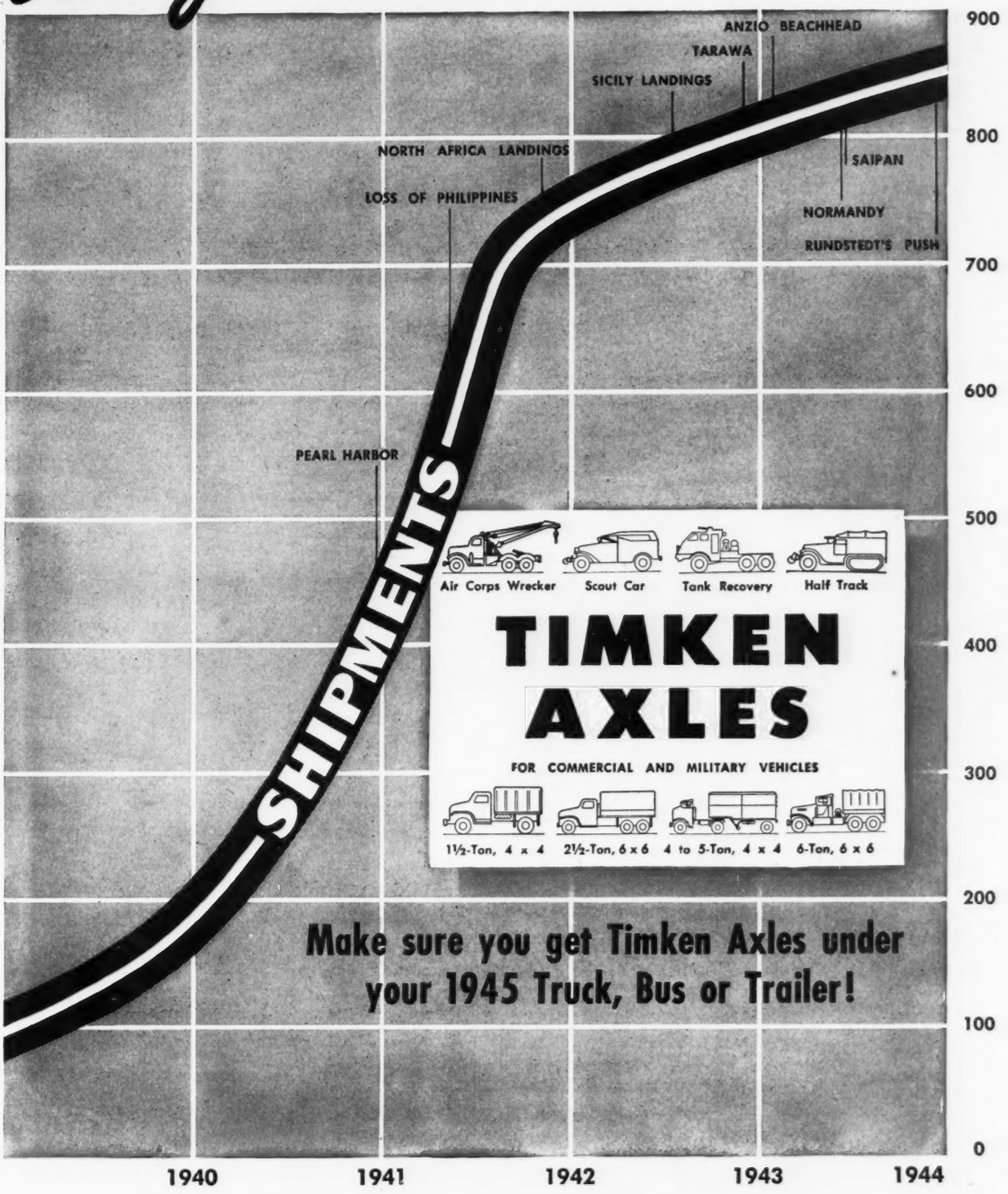
50 years of manufacturing blades has developed for you a special steel, milled through our own rolls and forged at the edges to give that extra wearing quality you need.

All widths lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

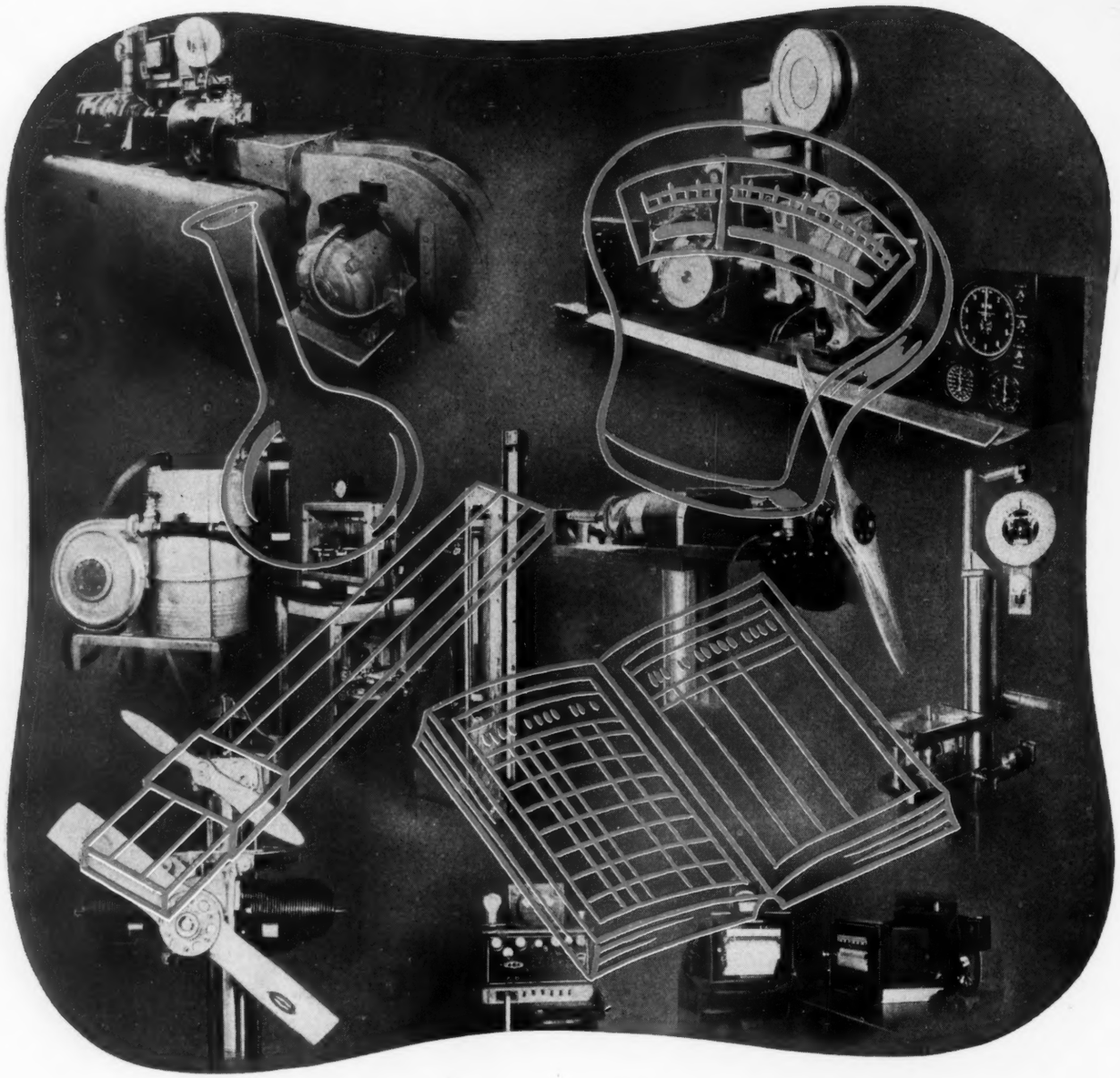
Shunk
Member of A.E.D.
MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO.

still going UP-UP-UP!



Make sure you get Timken Axles under your 1945 Truck, Bus or Trailer!

The Timken-Detroit Axle Co., Detroit 32, Michigan. **Wisconsin Axle Division, Oshkosh, Wisconsin.**



The finest and most complete research laboratory in the 2-cycle engine industry lends itself to Kiekhaefer's long experience and skilled personnel to insure continuous Mercury leadership.

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KIEKHAEFER CORPORATION • CEDARBURG, WISCONSIN

BUILDERS OF GASOLINE ENGINES EXCLUSIVELY

MERCURY

Outboard Motors • Marine Engines • Portable Industrial Engines • Aircraft Engines • Aircraft Auxiliary

Built to Use . . . . Built to Last

A GRIFFIN WELLPOINT JOB

means a Predrained Dry Bottom—Right from the Start

These Before and After Pictures Tell the Story...

Plan your next wet job around a Griffin Wellpoint System and save money RIGHT FROM THE START. Don't waste time with sump pits and then have to turn to wellpoints after a lot of good money has disappeared.

REAL profits are to be made — if you START with a Griffin Wellpoint System.

This contractor had used Griffin Wellpoint Systems on previous jobs. Satisfaction based on the evidence of his own cost records was PROOF that it ALWAYS pays to start the job with a Griffin System.

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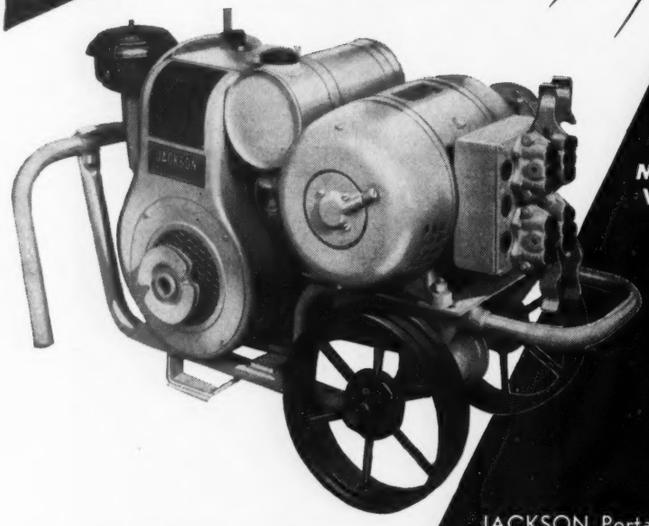

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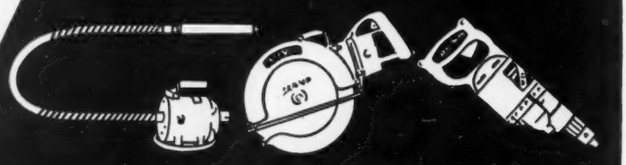
PORTABLE POWER PLANTS

JACKSON Portable Power Plants are backed by 25 years of dependable service to construction men. They are rugged, simple in construction and design and require only ordinary common sense maintenance . . . Available with wheels or plain skid mounts. JACKSON Portable Power Plants are made in 5,000, 2,000 and 750 watt sizes, generating 110-120, single phase and 3 phase, 60 cycle A.C. for operating light and heavy duty motors, vibrators, tampers, drills, saws, grinders and the like. Contractors will find these versatile plants ideal for lighting service on night or emergency jobs, for semi-permanent or permanent work in maintenance shops or tool cars. Voltage and frequency are quickly varied by engine governor adjustment.



POWER WHENEVER and WHEREVER YOU WANT IT

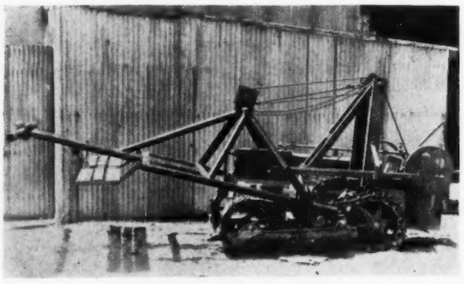
ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICHIGAN

SMALL-SIZE EYECUP SAFETY GOGGLE for women chippers is designed for those whose eyes are exposed to the hazards of flying objects from any direction. Fitted with clear flat Super Armorplate

lenses. Light in weight for comfort, yet sturdily made for efficient protection and durability. Each eyecup designed individually to fit orbit of eye. Goggle is low set for wide angle vision and has an insulated ball-chain bridge which can be adjusted easily and quickly. Adjustable headband. —**American Optical Co., Southbridge, Mass.**

★ ★ ★

ARC-WELDED ROCK AND ORE DRILLER mounted on a Caterpillar tractor enables two drillers to do the work of six using the old post and tripod method. This machine built by the Galena Machine & Electric Co., of Kansas and named a "Jumbo" is driven up to the ore face, the boom is raised to the proper height and a row of holes drilled. Unit is lowered twice more for other rows of



holes, driven to another set-up and process repeated. In building the Jumbo, the internal combustion unit was removed from the engine and an air head with four slide valves substituted. Crankshaft was cut at center bearing, one-half of it given a quarter turn, and two parts were then welded together, straightened and refinished. This places the throws of the shaft on 90 deg. around center. Cam shaft is driven by sprockets and chain and is timed to admit air to the cylinders at point where pistons are at top of stroke. Boom is made of 3-in. extra strong pipe, one end pivoted to a 3-in. double extra strong pipe by 2¼-in. pins fastened in each end of the 3-in. pipe with set screws. Double extra strong pipe replaces spring in front of tractor and supports engine. At other end of boom a 3-in. extra strong pipe 8 ft. long is fastened in the two clamps at the end of boom and two rock drills are mounted on this plate. Drill operators stand on platform which is hinged to boom at

(Continued on page 108)

MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

TRUCK-ENGINEERED **Stamina!**

"This will give you some idea of what this 1942 Ford is doing. You rate it at 1½ tons, but I installed a 5-yard body with side boards to carry 7 yards—over 9 tons. This is its daily job in all kinds of weather. I've used Fords since 1931—that's 13 years of satisfied service. Now, particularly, I feel lucky to have a Ford."
A. W. Avery

"...lucky to have a Ford"

—*says* A. W. AVERY, *Utica, N. Y.*

TRUE *TRUCK* ENGINEERING

Powerful truck engines—Six chassis types—for 95% of all hauling jobs.

FAMOUS FORD FEATURES

- **Service ease . . . engine crankcase, transmission, clutch and other chassis units readily accessible, hence—**
- **Low maintenance cost.**
- **Universal service facilities.**
- **Heavy-duty front axle—massive spindles—large taper roller wheel bearings.**
- **Extra-sturdy full-floating rear axle—pinion straddle-mounted on 3 large roller bearings—3 axle ratios available—2-speed axle optional at extra cost.**
- **Powerful hydraulic brakes—exceptionally large cast drums.**
- **Needle bearing universal joints.**
- **Rugged 4-speed transmission—large roller bearings.**
- **Shifto-Guide speedometer dial—saves fuel—saves wear.**
- **All-steel comfort cab—safety glass.**

STAMINA—endurance—has been engineered in generous measure into every chassis in the Ford Truck line. This stamina, put there by true truck engineering, shows up in long life, reliability and low ton-mile costs. Some million and a half Ford Trucks are proving this daily, all over America.

Ford Truck stamina reaches into every frame-section dimension, every axle and clutch and transmission and brake and spring-leaf specification, every feature of engine design.

It's there in special wear-resisting alloy steels, and in chassis or engine parts made longer-lasting through processes pioneered by Ford. It's there in cooling and lubrication and electrical units of extra capacity, longer life, easier maintenance.

The moderate price of your sturdy Ford puts this truck stamina to work for you with utmost economy. Repair parts are never costly, and expert Ford Protective Service is seldom more than a few minutes' drive from wherever you are. A third of all the trucks now in service in America are Ford Trucks. . . . for all of these excellent reasons.

Under government allocation, present production of Ford Trucks is necessarily limited as to types, equipment and quantities for essential civilian needs. See your near-by Ford Truck dealer for free counsel in obtaining official certification of your requirements.

Ford

FORD TRUCKS

AND COMMERCIAL CARS

TRUCK-ENGINEERED • TRUCK-BUILT • BY TRUCK MEN

A guide to eliminating deposits in transmissions

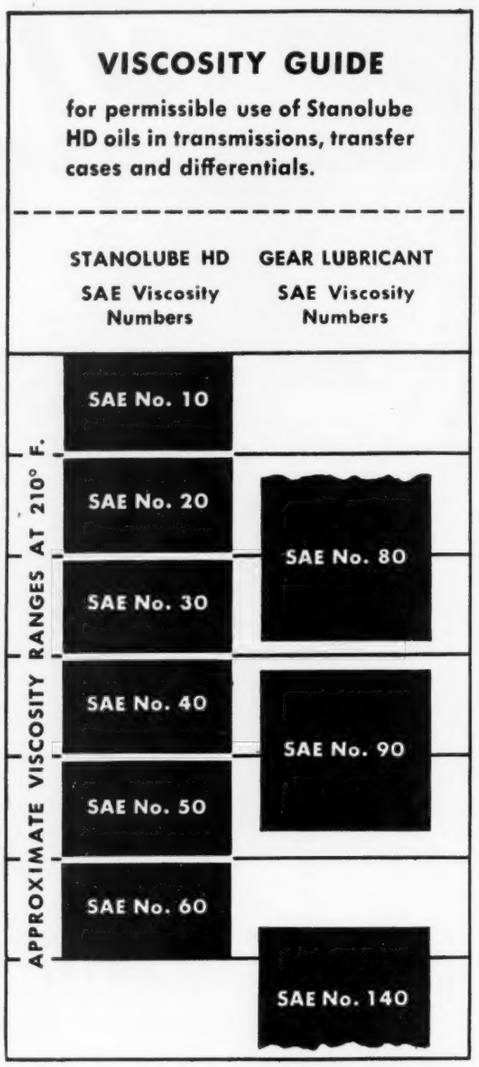
on trucks and buses with the right grade of Stanolube HD

TRANSMISSIONS in heavy duty truck and bus service frequently run as hot or hotter than crankcases. Heat and agitation are the two greatest enemies of any lubricant—they cause oxidation products, which, in turn, combine with dirt to form sludge and varnish-like deposits found in engines. For the same reason, these deposits form in transmissions.

Stanolube HD has a combination oxidation inhibitor and detergent additive. It resists the formation of oil oxidation products and also keeps these and other contaminants from settling out of the oil.

Fleet records show that Stanolube HD eliminates varnish and other deposits in both engines and transmissions. If you are having trouble with transmission failures, let a Standard Oil Automotive Engineer analyze your problem. Perhaps his recommendation of the right grade of Stanolube HD may save making many replacements of scarce transmission parts and bearings.

Call the local Standard Oil Company (Indiana) office, or write 910 South Michigan Avenue, Chicago 80, Illinois, for the Automotive Engineer nearest you.



The SAE grade numbers of motor oils and gear lubricants are based on two different numbering systems as shown in the above chart. This chart is a guide to the selection of the SAE grade of Stanolube HD corresponding with the SAE grade of gear lubricant you use.

Buy more War Bonds

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

AMERICA WANTS PROSPERITY

A BOOK to be published early in April by the McGraw-Hill Book Company carries the provocative title "Prosperity: We Can Have It If We Want It." Its authors, Messrs. Shields and Woodward, state in vigorously challenging terms their conviction that the United States will emerge from war with human, material and technological resources adequate to provide a nation-wide standard of living unprecedented in world history. They present, too, their formulation of the several policies and procedures which must be followed by government, business, and labor if we are to realize our potential for a high and sustained prosperity unmarred by prolonged periods of severe unemployment and business stagnation such as have haunted our economic past.

The specific proposals set forth will elicit both enthusiastic acclaim and acrid dissent, for the book deals in far from gentle fashion with many of the currently fashionable panaceas for assuring prosperity by magic formula. It examines, and discards as effective guarantors of prosperity, whatever their individual merits upon other grounds, programs for public works, slum clearance, subsidizing of small business, foreign loans, social insurance, deficit government spending, redistribution of income, the numerous formulae for monetary management, repeal of the anti-trust laws, or any of the loosely-phrased admonitions that government should do nothing and allow everything to take its course untrammeled by controls of any kind.

On the positive side, the book urges clear recognition of the fact that prosperity, under a system of business enterprise, depends primarily upon the existence of competitive incentives that spur capital investment to provide better tools and equipment, that improve organization and technology to insure continuously increasing productivity per man-hour of work, and that enlarge markets by producing what the consumer wants at lower prices to the end that real incomes may be increased.

In short, prosperity depends upon profitable and expanding business and employment opportunity, so it becomes the part of enlightened government, business, agriculture and labor policy to promote those measures which will forward rather than retard the major aim of expanding production.

However great the room for dissent upon the adequacy, or the phrasing, of the specific recommendations it makes, the approach of this book has one virtue of solid merit. It attacks positively the problem of what steps should be taken to achieve and hold prosperity rather than merely devising a poultice to be applied when and if we run into a decline.

Virtually all responsible spokesmen for government, and for business, labor, and agricultural groups, are agreed upon the goal of prosperity. Moreover, they agree that, insofar as possible, it should be achieved through the effort of private enterprise, with government intervention utilized only as a last resort. But despite this unanimity, almost all public discussion of the problem has concentrated upon the nature, the extent, and the timing of such government expenditures as may be found necessary to combat deflation. Since upon this question there is far from general agreement, our procedure has created an exaggerated sense of divergence in a field in which, so far as fundamentals go, we all are in accord to quite an unusual degree.

☆ ☆ ☆

No confusion should be caused by the fact that the generally current phrase for prosperity is "full employment." The latter phrase merely states the goal in terms of human values, which are good terms in which to state any goal. What matters is that we generally are agreed as to what we mean when we say that we want prosperity or full employment. Not only do we know what we mean, but within very rough limits we can give dimension to our concepts. There are a few whose appraisals are somewhat lower, but most competent estimators set the goals for about 1950 at an average annual employment in civilian jobs of between 55 and 57 million persons, with a gross national product of between $185 and $200 billion measured at 1943 price levels. This contrasts with the 1944 level of non-military employed of 51½ million, and a gross output for the end of 1944 of over $200 billion. It assumes a reduction of the average workweek to 40 hours.

It will take some such levels as these to provide employment for those who seek work, with only sufficient "frictional" unemployment (those temporarily listed as unemployed because of the normal turnover between jobs) to afford reasonable labor-market flexibility to both workers and employers. The non-military employment figures are generally consistent with the officially stated postwar goal of jobs for 60 million workers, since the latter figure is generally understood to be an estimate of the *labor force,* which includes members of the armed services and an allowance for frictional unemployment.

There are a number of reasons why the estimates cannot be figured more closely, and why no one can be very confident even of the validity of the stated limits. The chief points of doubt in the employment estimates relate to how many withdrawals there are likely to be on the part of women, oldsters, and youngsters, who now are in the labor force to a number more than 6 millions beyond normal expectancy; how many men will be retained in the armed forces; and whether the

postwar frictional unemployment should be calculated as approximating the current 1 million or the 3 million so-listed in the prosperous year of 1929. Additional uncertainties cloud the estimates of gross national product. Notable among them is the fact that no one is sure of the war's effect upon man-hour productivity trends, in view of the fact that half of our current output has consisted of products that had no substantial counterpart in our peacetime price or production series.

☆ ☆ ☆

Nevertheless, despite such qualifications, it is fair to say that we do have a general conception of the magnitude of our postwar goals. Although they are well within our production potentials as demonstrated in this war, they are formidably beyond any previous record of peacetime achievement. Only the most sanguine optimism could lead one to expect that they will be achieved without concerted will, planning, and cooperative effort. Only blind recklessness could engender confidence that once attained they will automatically be held, let alone expanded in normally healthful growth.

If we were to follow past patterns, our war-built boom would, after a period of uncertain length, collapse into disastrous depression. The very magnitude of our recent growth would contribute to the depth and duration of the subsequent trough. Yet a fall even to the level of our previous peacetime-peak-year 1939, has been estimated by The Federal Reserve Board to imply unemployment for between 15 and 20 million persons. If human values have importance, that is something that must not be allowed to occur. If business values have importance, we must not tolerate again such losses as occurred from 1930 to 1933, when sales over the four year period were $128 billion less than would have been provided if the 1929 level had held, and corporate profits declined from more than $7 billions in 1929 to an average annual loss of $1 billion over the next four years. A repetition of these things cannot be tolerated—*if foresight and cooperative effort can prevent them.*

☆ ☆ ☆

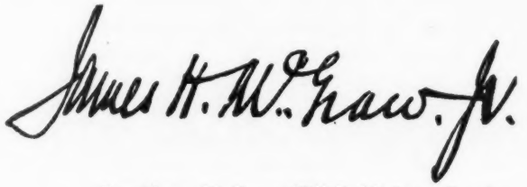
In January of this year Senator Murray introduced in the Senate a bill entitled "The Full Employment Act of 1945." It instructs the President to submit to Congress plans for eliminating both unemployment and inflation, including recommendations for correcting structural defects in the economic system. It provides for a Joint Congressional Committee to consider the proposals of the President, to take testimony from experts and the general public on these proposals or any others it may wish to consider, and after weighing all the facts to submit its findings to Congress. It provides for an advance budgeting of the constituent parts of a full-employment economy, and commits the Federal Government to provide, in advance, for sufficient expenditures (through private contractor channels) to make up for the gap between estimated private expenditures and the amount necessary to assure full employment.

By no stretch of the imagination can The Full Employment Bill, in its present form, be regarded as acceptable to business. Yet it may well present a test of whether or not American business can deal with problems in this area in a statesmanlike fashion. Such statesmanship will consist in demonstrating first, that the Bill is not acceptable because of deficiencies which preclude the possibility of its accomplishing the avowed purposes; and second, that business is able and anxious to offer constructive suggestions for remedying these deficiencies.

It is easy to point to weaknesses in the Bill. To mention only a few of major importance: The proposal to make advance Federal expenditures to compensate for estimated deficiencies in prospective private expenditures is completely impracticable. No one in the country can predict future trends with sufficient accuracy for this purpose; no one can tell what the constituent parts of a really high, *stable* peacetime budget should be, for in our boom-or-bust economy we have no stable pattern to project; no one can tell, within reasonable limits, how much the government should spend *in advance* to assure full employment. The Bill pronounces labor's right to work without defining commensurate responsibilities which it should exercise. It does not define the areas of proposed government expenditure in such a way as to allay business fears of government competition or the general public suspicion of leaf raking. Above all, the Murray Bill is defective in that, despite a somewhat vague pronouncement in favor of forwarding private business activity, it recommends a single specific designed to supplement such activity rather than stimulate it.

The very definition of certain of these faults suggests their remedies. But the positive task of stating how the Bill should be amended in order that it may have effective usefulness is far from simple. Yet it is enormously to the advantage of American business to undertake it. Fortunately, there is a representative group sponsored by industry, The Committee for Economic Development, which has for some time been working intensively upon the problem, and which is excellently equipped to offer sound and progressive advice. It should be used for this purpose.

American business cannot afford to take a negative attitude toward legislation in this field. Some legislation undoubtedly will pass, for the problem is one in which there is a grave government responsibility. But equally there is a comparably important responsibility upon all citizen groups. None of them has more to gain or lose from the rise or fall of prosperity than American business.

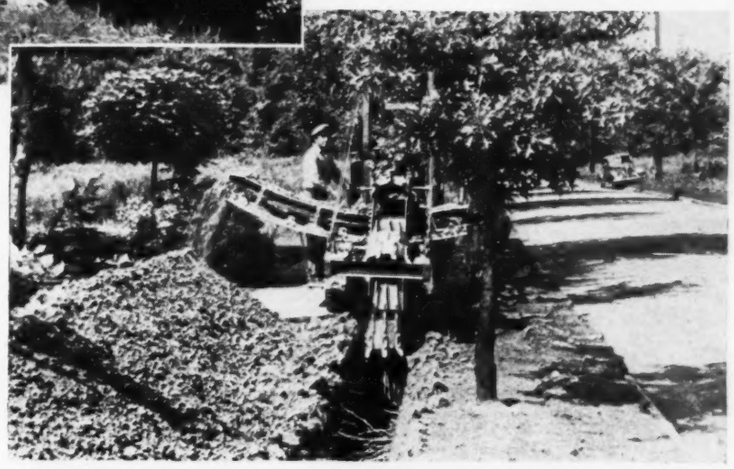


President, McGraw-Hill Publishing Co., Inc.

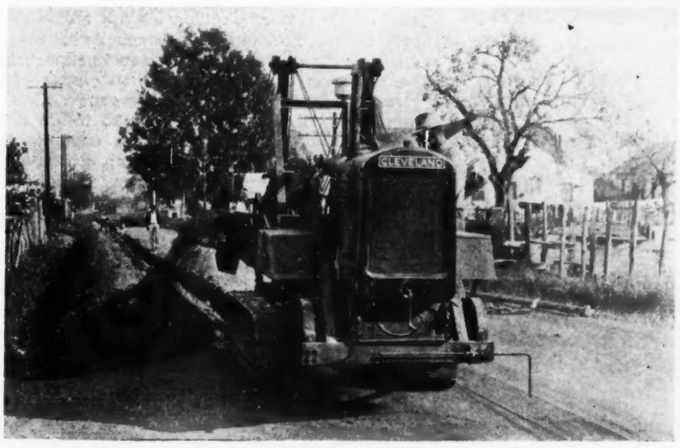
DEPENDABILITY

Another "CLEVELAND" Characteristic—

Because of their correct design and superior Quality Construction insuring ruggedness, strength, stamina and power "CLEVELANDS" can be DEPENDED on to carry through on the toughest jobs, as demonstrated in the illustration at left.



Because of their compactness, absence of bulk and dead weight, their quick shift conveyor and full crawler mounting "CLEVELANDS" can be DEPENDED on to overcome quickly the many handicaps encountered in digging Trench in congested areas. Note in illustration at right how "CLEVELANDS" travel along the tree lawn and sidewalk without damage and how easily the conveyor can be positioned to pass trees, poles or other obstacles . . .



"CLEVELANDS" because of their large number and wide range of speeds, their ease of mobility (truck or trailer) and their unsurpassed maneuverability can be DEPENDED on to get to the job and get the job done FASTER.

"CLEVELANDS" are backed by a DEPENDABLE Parts Service, so important to all machinery users. CLEVELANDS awareness of this vital service is shown by its maintenance of unexcelled parts service under present war conditions.

You can DEPEND on "CLEVELANDS" too, to maintain its leadership in the Trenching Machine Field in the post-war era.

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Pre-Engineering

• Here's a *factory-built* conveyor system that will fit your *custom-built* plant completely!

No special engineering. No delay for estimates on cost. No weeks of waiting for factory fabrication. Barber-Greene Conveyors are pre-engineered—pre-fabricated!

B-G Conveyors are built in a variety of sizes, forms and capacities to meet any material handling requirement . . . can be installed anywhere.

Erection costs? Your own workmen can install a B-G Conveyor system quickly, easily. Units arrive on the job conveniently marked. Factory assembled terminals and standardized units simplify and speed erection.

Barber-Greene Conveyors are *standardized*. You can make additions and alterations rapidly . . . move it to a new location with 100% salvage. Factory assembly assures correct alignment in erection—reduces belt wear and maintenance expense. Write for Catalog 76. Barber-Greene Company, Aurora, Illinois.

45-20A

Barber B G Greene

Constant Flow Equipment

(Continued from page 104)

back and supported in front by chain which is adjustable to keep platform level. Air-driven winch is built from block assembly in same way as engine. On one side of tractor just above tracks is an air receiver fabricated of 8-in. pipe 5 ft. long with pipe couplings welded on, from which air is taken to run the winch, motors and the two dock drills.—**The Hobart Brothers Co., Hobart Square, Troy 1, Ohio.**

★ ★ ★

2-IN. SOLID PARTITION made of Rocklath plasterboard and Red Top plaster is claimed to cut lumber requirements for partitions 90 per cent below that of standard frame construction, to reduce amount of metal usually required in other types of solid plaster partitions, to produce a partition that can be built quickly, that is low in cost, that won't burn and that is strong and durable. Installation

procedure is as follows: Runner strips with grooves into which core of partition fits are nailed to floor and ceiling. Framing then is completed with vertical erection of 24-in.-wide square-edge plasterboard, lower end of which fits in groove of floor runner and upper end in ceiling runner. One side of plasterboard is braced firmly to insure rigidity while plaster is applied. Scratch coat of plaster is applied to both sides, and brown coat is applied to side opposite braces. After plaster has set and partly dried, braces are removed and brown coat is applied to remaining side. Finish coat of plaster completes the partition.—**U. S. Gypsum Co., 300 W. Adams St., Chicago, Ill.**

★ ★ ★

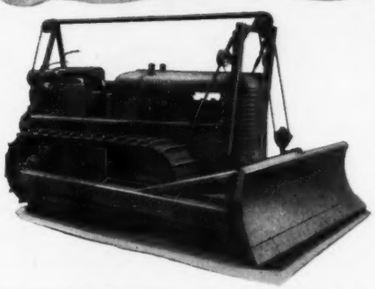
DUAL-PURPOSE SAFETY NUT, featuring installation ease, safety and low cost, operates on principle of engagement of a snap ring in one of seven longitudinal serrations in bolt thread, providing fourteen locking positions per revolution of nut. Can be used on any length thread and may easily be locked or unlocked by flip of locking ring. Serrations in bolt thread are cut by internal broaching tool in fraction of time needed to drill cotter pin holes. Broaching tool designed for use in close

(Continued on page 110)

GAR WOOD ROAD MACHINERY

STAYS ON THE JOB

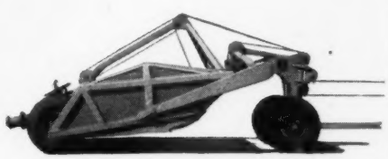
GAR WOOD GW ROAD MACHINERY TRADE MARK



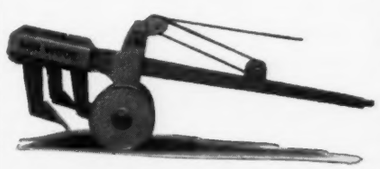
CABLE DOZECASTERS with angling blade for Allis-Chalmers HD-10 and HD-14 Tractors

4-WHEEL HYDRAULIC SCRAPERS
Capacities: 8-10-15 cu. yds.

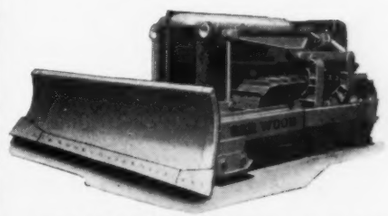
Gar Wood Industries, Inc., manufactures a complete line of heavy-duty earth-moving machinery • • • 2-wheel Scrapers, 4-wheel Scrapers, Bulldozers, Roadbuilders, Dozecasters, Rippers, Tamping Rollers and Cable Control Units. When anticipating your earth-moving equipment needs, be sure to investigate this modern well-constructed line. Your Allis-Chalmers Industrial Tractor Dealer will be happy to point out the features that make Gar Wood Road Machinery outstanding in the earth-moving equipment field. Get the maximum in performance with a minimum of "down time" • • • buy *GAR WOOD.*



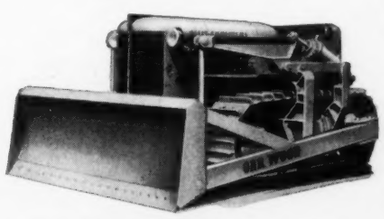
4-WHEEL CABLE SCRAPERS
Capacities: 11-15-20-25 cu. yds.



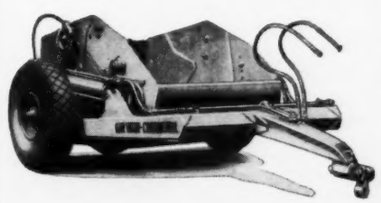
HEAVY DUTY RIPPERS
Cable and hydraulic operation



HYDRAULIC ROADBUILDERS with angling blade. For all Allis-Chalmers Tractors

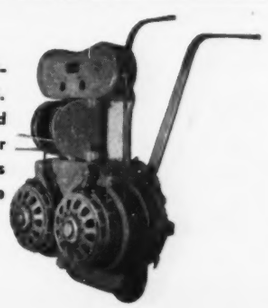


HYDRAULIC BULLDOZERS with fixed blade.
For all Allis-Chalmers Tractors



2-WHEEL HYDRAULIC SCRAPERS
Capacities: 3-5-6-8 cu. yds.

CABLE CONTROL UNITS. Double and single drum for 'most all makes of track-type tractors



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OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

the "business end"

OF A MARMON-HERRINGTON *All-Wheel-Drive* CONVERTED FORD

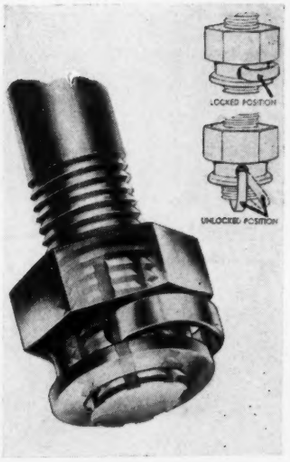
● It's the *front-end* of a Marmon-Herrington *All-Wheel-Drive* converted Ford that really gives "the business" to mud, sand, snow, steep grades and all other types of "tough going."

Of course, the rear axle and wheels are doing their part too—but it is the *added power and traction through the front wheels* that gives this truck its outstanding ability—enable it to out-perform any conventional drive truck, regardless of size or engine power. Marmon-Herrington built trucks are still going to war. Substantial numbers of them are leaving our plant each week, going to join the thousands of Marmon-Herrington *All-Wheel-Drive* trucks, track-laying tractors and combat tanks now at the battle fronts.

But there's a possibility that *you* may be able to get delivery of a Marmon-Herrington *All-Wheel-Drive* for your work soon. Better get your order in line!

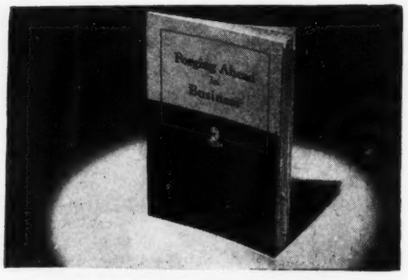
MARMON-HERRINGTON COMPANY, INC.
INDIANAPOLIS 7, INDIANA

MARMON-HERRINGTON
***All-Wheel-Drive* TRUCKS**



(Continued from page 108)

quarters and may be hand-operated in case of preassembled parts. Used as stop nut, serrations in bolt thread are not necessary. When nut is tightened and locking ring snapped in locked position, spring pressure provides stopping action. Withstands abnormal heat, moisture and oil conditions. Requires no additional torque or wrench pull and can be turned down by hand until work is contacted. Any standard open-end socket wrench will fit over nut. Requires no special bolts. Locking ring is permanent part of nut.—**Simmons Machine Tool Corp., Albany, N. Y.**



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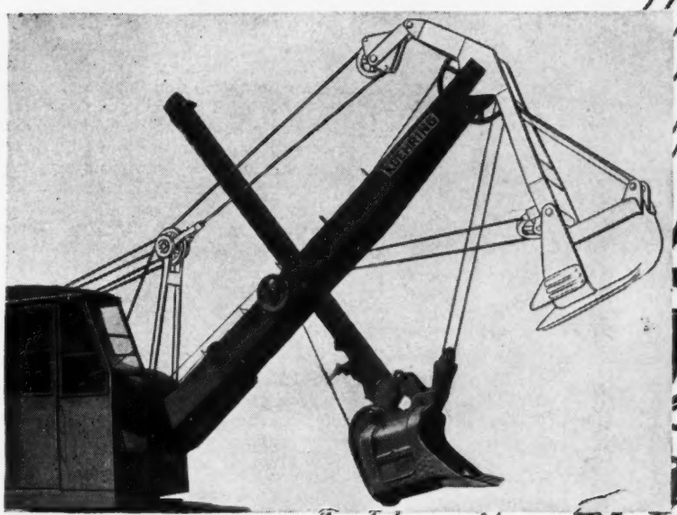

AS CLAMSHELL OR LIFTING CRANE:

Material handling or setting steel is easier with the 205. Steel goes up right . . . off the stock pile fast, then inched into place without jockeying, smooth, fast acting controls simplify accurate clamshell spotting.

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Tops for drainage work because reserve power outpulls suction, fairlead saves drag cable, traction brakes STOP when you want STOP, fast acting clutches and brakes produce longer bucket casts.

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ARMY E NAVY

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

BUDA earth drill

DEEP HOLE

Model HBH For—

- Soil Testing
- Geophysical Work
- Strip Mine Testing
- Drilling Through Overburden
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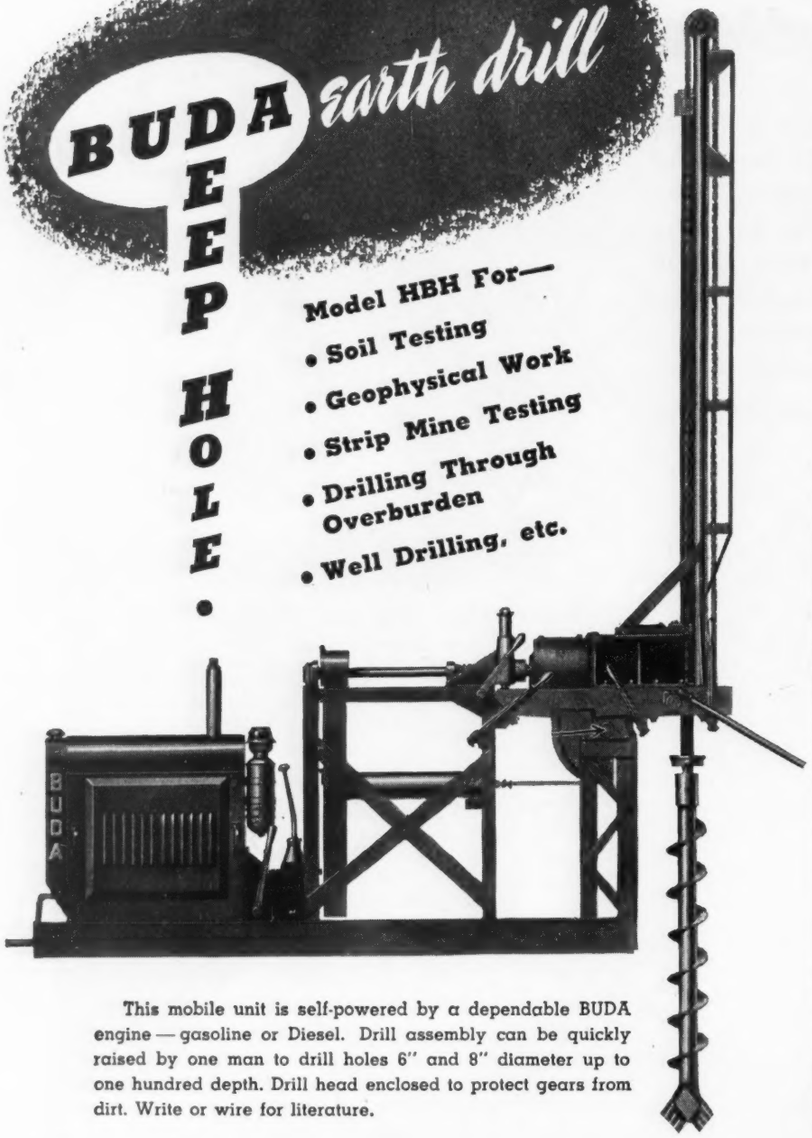

This mobile unit is self-powered by a dependable BUDA engine — gasoline or Diesel. Drill assembly can be quickly raised by one man to drill holes 6" and 8" diameter up to one hundred depth. Drill head enclosed to protect gears from dirt. Write or wire for literature.

Up to 100 ft. depth ——————→

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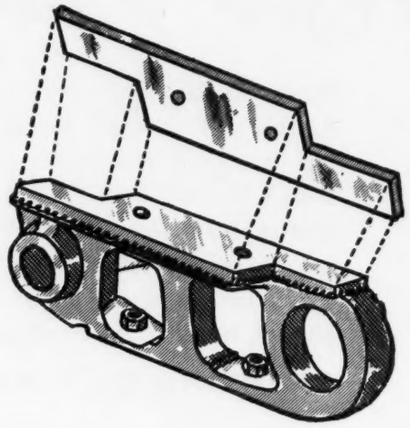
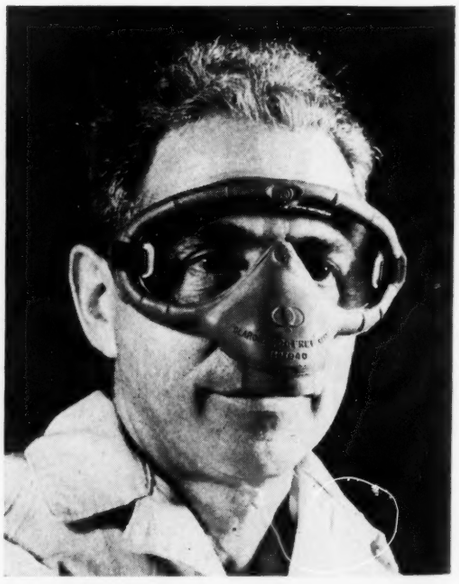
SPECIAL STEELS FOR WELDING reduce to a minimum repair and replacement costs and "lay-up time" in reconditioning worn tractor links on tractors. Link castings may now be salvaged by



welding on to rail surface a special steel plate which builds up worn surface, restoring worn casting to its original weight and thickness. These plates made of special work-hardening steel which becomes harder and tougher with use are fabricated to correct sizes to fit the track link casting and are affixed by gas or electric welding. It is claimed that approximately 200 lb. of these plates will save purchase of ton of castings.—**Allied Steel Products, Inc., N. B. C. Bldg., Cleveland 14, Ohio.**

★ ★ ★

FOG-FREE GOGGLES utilize lungs as natural ventilating pump preventing fogging or clouding of lens regardless of how much the wearer perspires. Normal breathing sweeps complete change of fresh air in front of eyes about once every



second, removing moisture from within goggle before there is enough of it to condense as fog on the plastic goggle lens, thus providing unblocked vision as well as eye protection against dust and other flying particles.—**Polaroid Corp., Cambridge 39, Mass.**

1. BIGGER TRUCK LOADS

Right from the start, easy-to-handle Transite Pipe begins to pay off. Its light weight means more footage carried per truck load . . . lower transportation costs.

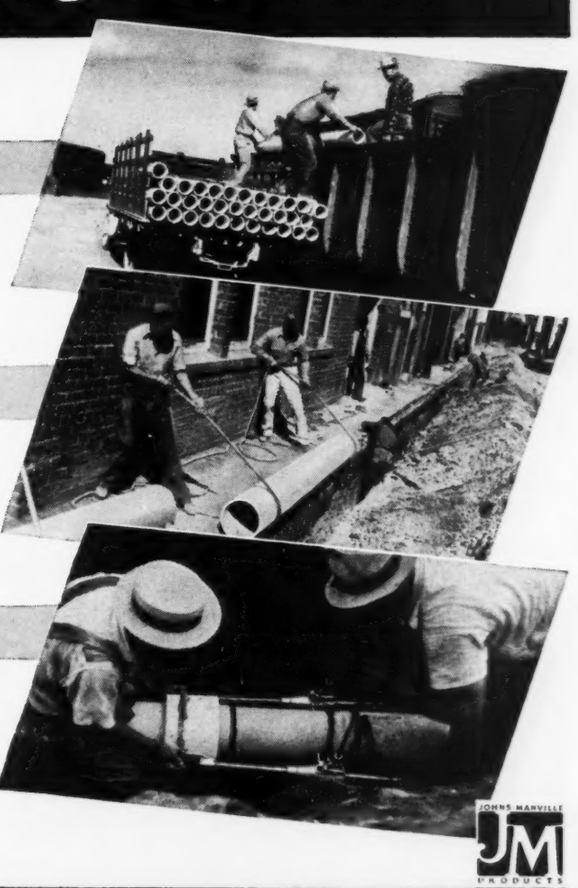
2. SMALLER CREWS

On the job, it takes fewer men to handle Transite Pipe, and smaller installation crews mean lower installation costs. Mechanical handling equipment is not necessary except for the larger sizes.

3. FASTER ASSEMBLY

In the trench, Transite Pipe is assembled easily, quickly, even by unskilled crews. Its exclusive Simplex Coupling assures tight joints, even when the line is deflected as much as 5° at each joint.

And in service, Transite Pipe pays off in efficient, dependable water transportation. Made of asbestos and cement, this non-metallic pipe is immune to tuberculation, highly resistant to soil corrosion. Its low maintenance has been proved in thousands of installations.



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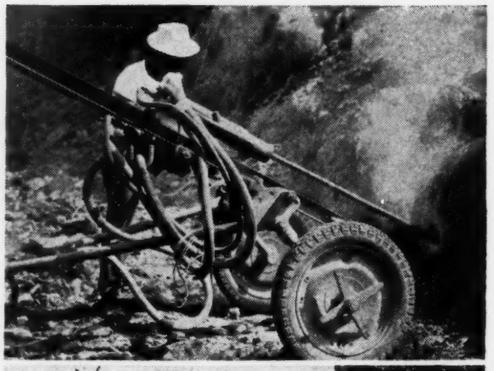
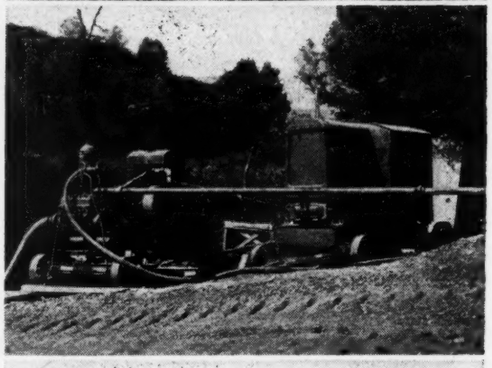
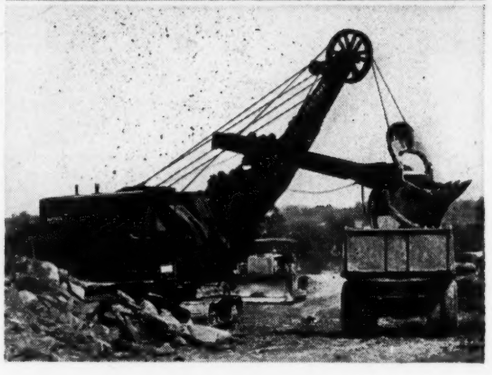
JOHNS MANVILLE JM PRODUCTS

TRANSITE PIPE
FOR EFFICIENT, ECONOMICAL WATER TRANSPORTATION

FROM START TO FINISH BUILD THE ROAD WITH BETHLEHEM STEELS







The Bethlehem hollow drill steel bites into hard rock, preparatory to blasting. From then on, there's a Bethlehem product to give rugged service, and to keep things moving along at top efficiency, in every important step in highway building.

Bethlehem Purple Strand Wire Rope lends a hand in the task of moving mountains of rock and earth, and in digging for sub-drains. Bethlehem corrugated sheets make culverts—or Bethlehem reinforcing bars go into concrete culverts. Bethlehem pipe carries water—many miles, perhaps—to the job.

Into the road go Bethlehem road joints, supplied assembled for placing. As the finishing machine moves along, Bethlehem bar mats are set in place. Then Bethlehem products mount guard along the completed highway—Safety-Beam or Cable guard rails, highway guard posts, right-of-way fence and posts.

Plan your postwar highways the Bethlehem way—by ordering all your road steel products from this one reliable source. It will save you time and, perhaps, many a headache. For full information about Bethlehem road steel service, get in touch with the nearest district office, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

RUST—a nuisance and a very costly menace in many places no longer need be tolerated. Laboratory magic has furnished its master.

New Sinclair products, developed to solve tremendous military rust problems, are now available for your problem.

Sinclair RUST-O-LENE B for exposed metal surfaces of machinery in operation, in storage, or in transit

—provides a firmly-adhering rust proofing film
—prevents rusting of clean surfaces
—halts further rusting of corroded surfaces
—has lubricating qualities
—defies any degree of moisture from mere dampness to heavy rain
—can be readily removed when desired

Sinclair OPALINE RP (Rust Preventing) OILS for enclosed oil systems, prevent internal rusting of engines, hydraulic systems, gear reducers, and similar machinery intermittently operated, stored, or transported. OPALINE RP also has ample lubricating qualities for temporary use.

Both these remarkable Sinclair rust-preventives have successfully passed the most exacting service tests, and fully meet Government specifications.

Learn how RUST-O-LENE B and OPALINE RP can combat rust for you. Write for brochure giving full details.

SINCLAIR LUBRICANTS—FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL *WRITE* SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Rust-O-Lene-Opaline Reg. U.S. Pat. Off.

ABSORBS POWER

to control speed on downgrades

Absorption of power by the HYDROTARDER on the drive shaft between transmission and differential relieves the brakes and motor of this strain, effecting a saving in oil, gas, tires, brake and motor maintenance that quickly pays for the Hydrotarder.

Its fluid friction resistance to power generated by the descending truck is controlled by a "choke type" rod on the instrument panel, giving the driver complete and positive control of the truck speed throughout the entire descent. Mechanical brakes are used only when coming to a complete stop.

Any truck owner hauling heavy loads, in grade country, will profit by using the HYDROTARDER. Ask now for full details.

Parkersburg HYDROTARDER

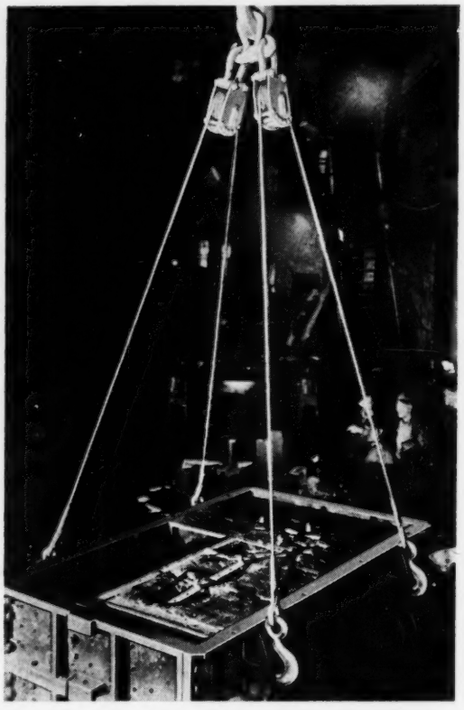
Distributed by

HETZEL BROTHERS, *Engineers and Manufacturers*
1972 Los Angeles Street — Los Angeles 11, California

THE WINTER-WEISS COMPANY
22nd and Blake Streets — Denver 2, Colorado

THE POINTER-WILLAMETTE COMPANY
238 N. E. Oregon Street — Portland 14, Oregon

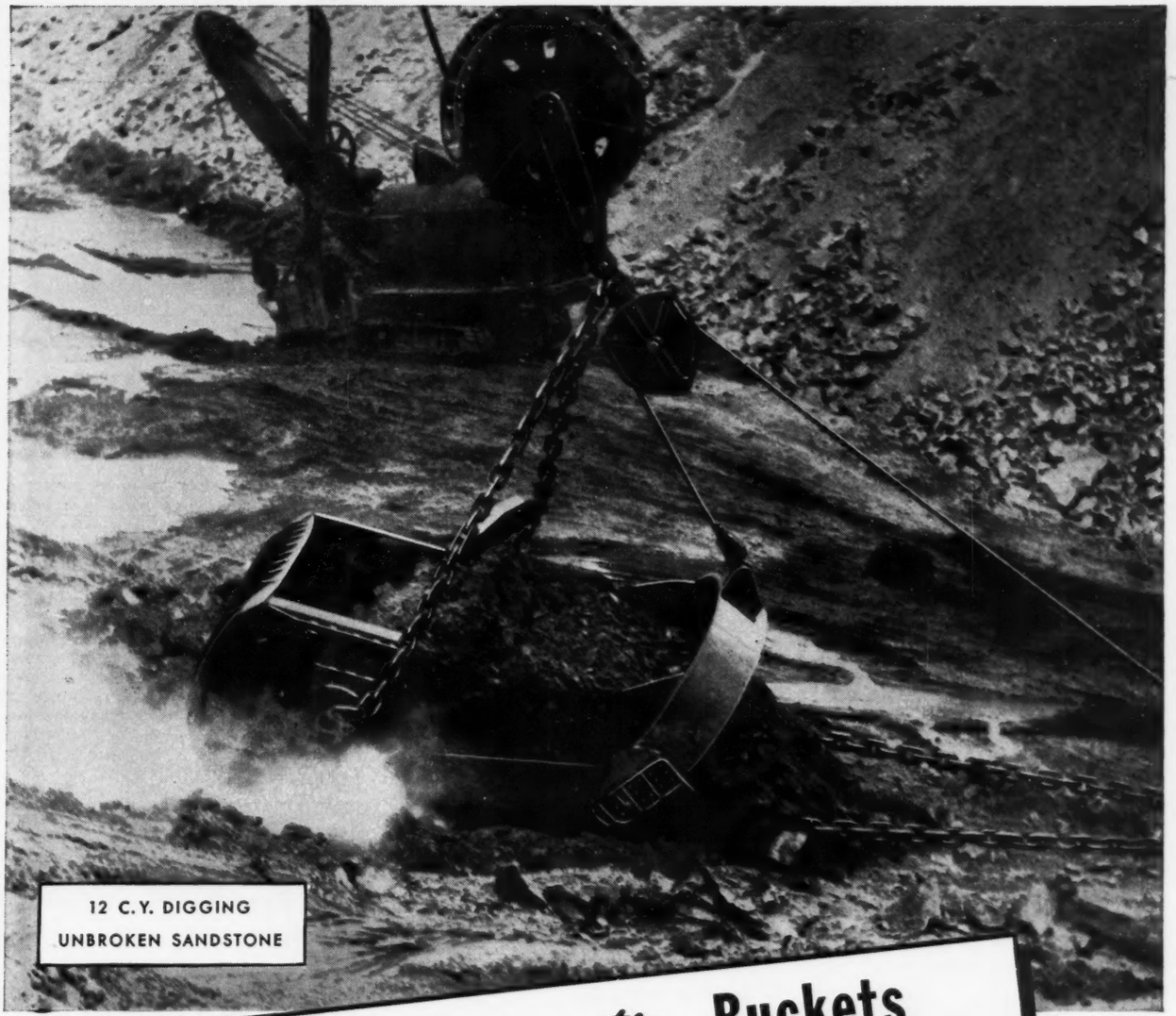
"LEVEL-LIFT" SLINGS are now made in ¾-, 1½-, 3- and 6-ton capacities instead of the former 3 and 6-ton models that were available. To operate, lightweight block containing wire rope is put on crane hook, crane operator spots hook over approximate center of gravity of load and floormen



attach sling to load. Operator then applies power to lift load and as crane hook is lifted, rope automatically adjusts itself through "level-lift" block. In so doing, one sling leg of rope becomes longer than other and as weight of load pulls on wire rope, sheave in block pulls down against brake which prevents slippage. Load is then lifted level. Should crane operator not get block and crane hook close enough to center of gravity of load, it is only necessary for operator to lower load enough to relieve tension on sling and release brake and then move crane hook over a little to true center of gravity. On applying power, ropes readjust themselves and load rises level.—**Mac-Whyte Co., Kenosha, Wis.**

★ ★ ★

ACID-AND-ALKALI-PROOF CEMENT for bonding brick or tile in acid-proof masonry construction is a resinous cement based on Duralon series of synthetic resins. Duracite comes in the form of a liquid and powder and is mixed on the job at the time of use. It is of the quick-setting type, taking an initial set in less than 30 min. Duracite shows virtually zero absorption characteristics and excellent resistance to most inorganic acids, organic acids, all alkalies, oil and solvents at temperatures up to as high as 375 deg. F. Unlike most resinous cements, Duracite has a practically indefinite shelf life, showing no deterioration in storage. Setting time easily controlled to suit requirements of individual job. Normal setting time, however, permits continuous laying of brick. Tough, durable, easy to use. Highly resistant to abrasion, to impact shock and to rapid changes in temperature.—**U. S. Stoneware Co., Akron, Ohio.**



Page *Automatic* Buckets
DIG FASTER

● SEEING a Page AUTOMATIC bucket in actual operation is more convincing than a thousand words. It ALWAYS lands with all weight on the teeth . . . it digs at first pull of the load line without resting on its bottom . . . and loads within only one or two bucket lengths!

Get maximum production from YOUR dragline machines . . . Install Page AUTOMATIC buckets NOW!

PAGE
Automatic
DRAGLINE BUCKETS

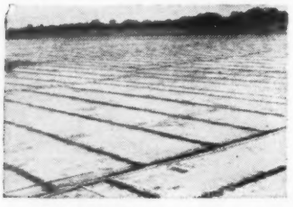
PAGE ENGINEERING COMPANY, CHICAGO 38, ILLINOIS

SISALKRAFT

BLANKETS SAVE TIME, MANPOWER AND MONEY IN CURING!

SISAL REENFORCEMENT GIVES STRENGTH AND TEAR RESISTANCE

LOW-COST PROTECTION On ALL Road Jobs!



PROTECTING SOIL CEMENT

PROTECTING ROAD MIX

PROTECTS MATERIALS STORED IN THE OPEN

UNMATCHED in their ability to hold moisture within the slab, SISALKRAFT Road Blankets have a time-proven record as the Number One concrete curing agent — producing denser, longer lasting concrete roads at low cost.

Savings in time, manpower and money are effected by the speed with which two men apply SISALKRAFT Blankets over the slab. No sprinkling — no burlap — just "let 'em lay." The concrete cures automatically! The slab is protected from weather and dirt! The blankets are used again and again.

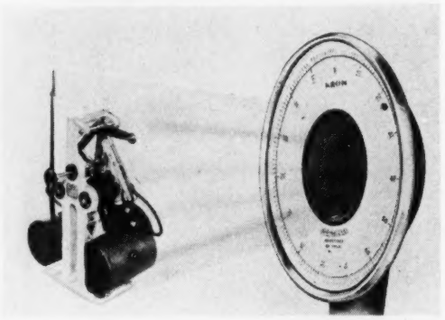
Protect soil cement, road mix, materials and equipment with SISALKRAFT. It's tough, weatherproof, scuffproof, tear-resistant!

As vital war needs decrease, more and more SISALKRAFT will be available for your use. Victory comes first — and that's the way you want it, we're sure.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY

Manufacturers of
SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

SPRINGLESS DIAL SCALE with ball-bearing, double-pendulum-type mechanism is precision built instrument for speeding up weighing, counting, batching, measuring and testing operations. Specially designed ball bearings eliminate wear at bearing points and gear sector and shafts carrying indicator and pendulum arm weights are all



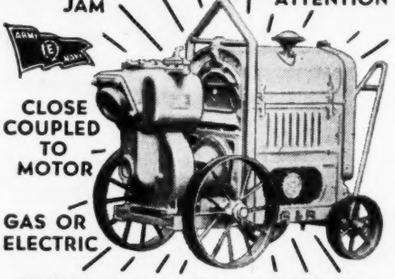
mounted in fixed centers, assuring perfect alignment and preventing these parts from being unseated even when subjected to shocks or jarring vibrations. Friction and wear of dial indicator shaft and sector gear teeth are minimized through an auxiliary sector which absorbs backlash. Special non-vibrating sector may be incorporated in mechanism practically to eliminate the effect of outside vibration. Shocks and variations of temperature are compensated for by an adjustable and non-leakable oil dashpot. This dial mechanism interchangeable in all Kron scales regardless of capacity or type.—**Yale & Towne Manufacturing Co., Philadelphia, Pa.**

Streamlined INSIDE for Higher Efficiency and Lower Operating Costs

NO ORIFICE OR PRIMING VALVES TO CLOG OR JAM

HOLDS PRIME

REQUIRES LITTLE ATTENTION



CLOSE COUPLED TO MOTOR

GAS OR ELECTRIC

RUGGED SIMPLICITY OF DESIGN ELIMINATES RECIRCULATION — DELIVERS GREATER VOLUME PER GAL. OF GAS

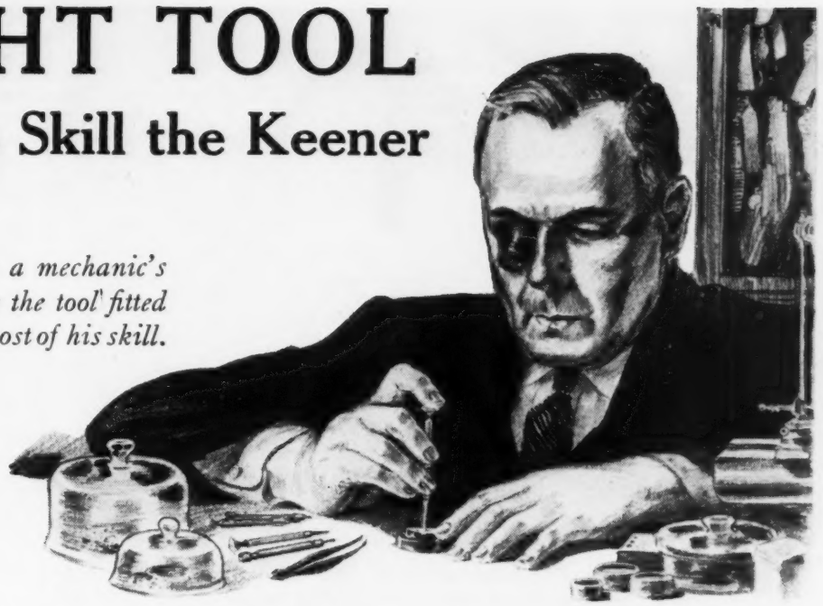
CAPACITIES UP TO 125,000 GPH

The GORMAN-RUPP CO. Mansfield, Ohio

GORMAN-RUPP
Self-Priming Centrifugal Pumps

The RIGHT TOOL

Makes His Skill the Keener



No watchmaker uses a mechanic's screw driver. He needs the tool fitted to the job to make the most of his skill.

So it is with blasters. They, too, need the explosive best fitted for the job in hand. Used correctly, in the right amount, it produces the blasting result that is wanted.

While some explosives produce the results on many jobs, no one type explosive can be used with effectiveness on every job.

ATLAS EXTRA DYNAMITES (Ammonia Dynamites) Medium velocity. Heaving and stressing action. A good all-around construction and quarry explosive.

ATLAS EXTRA DYNAMITES (AMMONIA DYNAMITES)

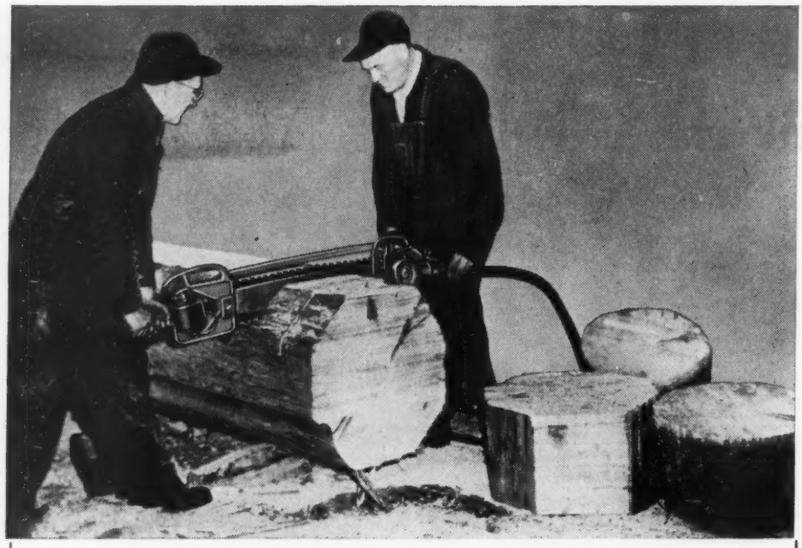
GRADE	% Weight Strength	Velocity, feet per second, in the open 1¼" x 8"	Velocity, feet per second, confined in pipe 1½" x 8"	MINIMUM NUMBER OF 8" CARTRIDGES PER 50 LBS. (MAXIMUM 10% MORE)								
				⅞"	1"	1⅛"	1¼"	1½"	1¾"	2"	4"	5"
60%	60	12000	17000	208	160	128	105	72	54	41	11	7
50%	50	10500	13000	208	160	128	105	72	54	41	11	7
45%	45	10000	12900	208	160	128	105	72	54	41	11	7
40%	40	9300	12000	208	160	128	105	72	54	41	11	7
33%	33	8900	11500	208	160	128	105	72	54	41	11	7
30%	30	8500	11000	208	160	128	105	72	54	41	11	7
25%	25	8200	10500	208	160	128	105	72	54	41	11	7
20%	20	7800	10000	208	160	128	105	72	54	41	11	7
15%	15	7300	8500	208	160	128	105	72	54	41	11	7

Talk over your blasting problems with the Atlas Representative. You know your operation. Add his training and experience in both explosives and their application to field conditions and find the one explosive and blasting formula for the right blasting result.

ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. · Offices in Principal Cities · Cable Address—Atpowco



Cutting an octagonal boom of 24 inch Oregon fir, after having made longitudinal slab cuts.

A 42 LB. BABY THAT DOES THE WORK OF 10 MEN

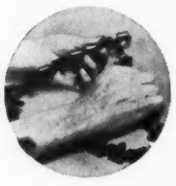
For construction that involves heavy cutting, for cleaning roads or any work in sawing or felling trees or heavy timbers, the new Lombard air-driven chain saw is the baby that does the job of ten men.

Weighing only 42 pounds — 10% less than other makes — this husky air-driven, 24 inch tool goes through soft wood at an average of about an inch a second — hard wood in about double this time. Cuts a clean even track. Operates from a standard 105 cu. ft. compressor.

Also available in 3 h. p., 60 cycle, 220 volt, 24 inch and 36 inch cutting blades. Write for literature.

New Easily Detachable Helper's End with One-Shot Lubrication

New Quick-Change Interlocking Chain



Dealer Opportunities in Some Areas

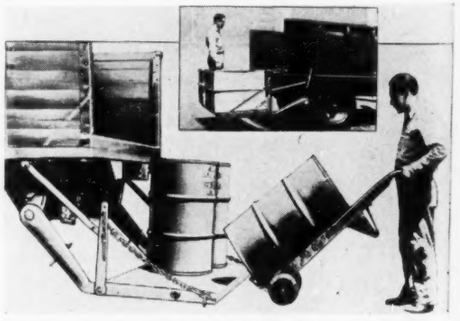
LOMBARD
GOVERNOR CORPORATION
ASHLAND, MASSACHUSETTS

PORTABLE ELECTRIC HAND SEARCHLIGHT projects an intense beam of more than 2,500 ft., or by means of a snap-on lens, will give the same volume of light over a wide area. Powered by heavy-duty, shockproof 6-v. storage battery, rechargeable from an ac. charger, dc. line or light plant. Recharging is accomplished without removing battery from container. Lamp head may be turned in any direction and stays adjusted. May

be carried either by hand or shoulder strap, may be set almost anywhere and by use of a hold-down, can be securely anchored to any flat surface. "Big Beam" is claimed to be dependable, economical in operation and adaptable to a wide range of uses—for maintenance, repair, plant protection, fire, police and street departments, public utilities, construction and telephone work, trucks, trailers and aviation fields.—**U-C Lite Manufacturing Co., 11 E. Hubbard St., Chicago 11, Ill.**

★ ★ ★

ELEVATING ENDGATE which may be installed in place of the ordinary endgate on any type of truck or truck-trailer and hydraulically driven by power from the truck engine handles heavy materials up



to 1-ton capacity. Using this device one man can readily handle loads usually requiring several men, and cut to a fraction time required for loading and unloading operations. Endgate of steel construction is controlled by levers at rear of vehicle. Shift of one lever smoothly raises and lowers loads to truck-floor level or to ground.—**Fruehauf Trailer Co., 10940 Harper Ave., Detroit, Mich.**

A Star Performance— Road-Ability Plus Digging Speed

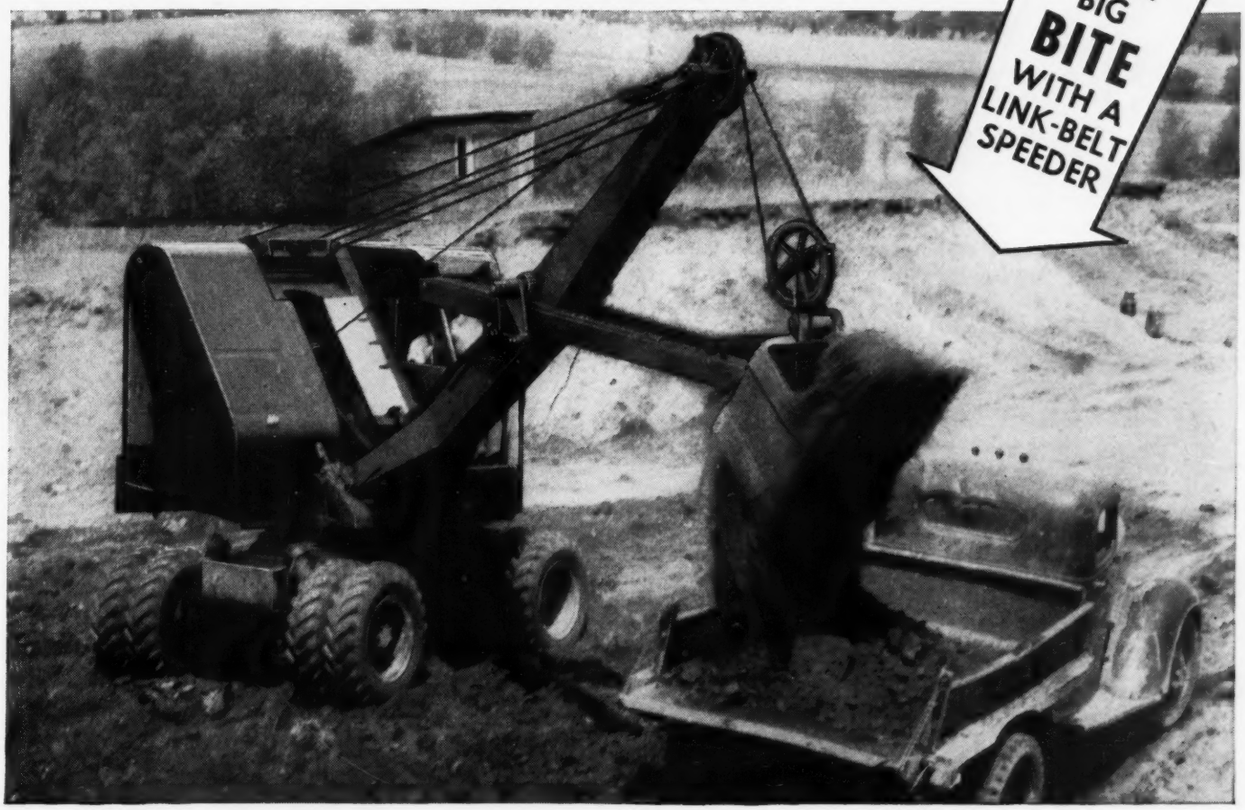
In the wheel-mounted utility crane Model UC 55, Link-Belt Speeder has developed a mobile unit that goes places in a hurry — to do the score of different jobs that make up the schedule of state highway, county or township road departments and contractors.

Fast— it gets about on highways at ten miles per hour!

Powerful — swings a half-yard dipper and has a lifting capacity of 6 tons.

Quickly Convertible — use it as shovel, dragline, crane, trench hoe, pile driver or clamshell.

Easy to Operate — result of advanced engineering and hydraulic controls. Built for long life, trouble-free operation. Send for folder 2051, *today!*



For Prompt, Efficient, Convenient Sales and Service, There is a Link-Belt Speeder Distributor Located Near You.

9979

LINK-BELT SPEEDER

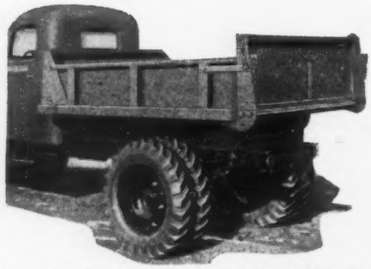
Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
(A DIVISION OF LINK-BELT COMPANY)

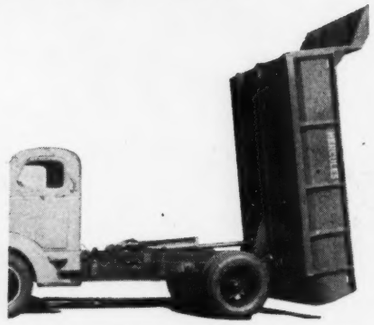
For Every Dumping Job, There's A

HERCULES HYDRAULIC

Dump Body and Hoist



Hercules Removable Side Rub Rail Body With Hinged Rear Corner Post.

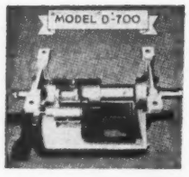


Hercules High Dumper-Power Up, Power Down, with 78° dumping angle. Hoist capacity 12 tons.

Many other body styles in many sizes, and 6″, 7″, 8″ and 10″ Hoists, are available.

USE THE HERCULES SPLIT-SHAFT POWER TAKE-OFF

To operate any truck-mounted equipment



Direct (D-700 Series), Side (D-800 Series) and Dual Drive (B) models are available for operation of almost every possible type of truck-mounted equipment, either singly or in combination.

Recommendations and complete specifications upon request.

A HERCULES HYDRAULIC BOOSTER HOIST

Makes any Truck A **DUMP TRUCK**

UNLOAD the EASY WAY! SAVE TIME, MANPOWER and MONEY by installing Booster Hoists under your Stake, Platform, or Special Bodies. 50° Dumping Angle will dump any material such as Coal, Grain, Earth or Sand.

See your Hercules Distributor or Write

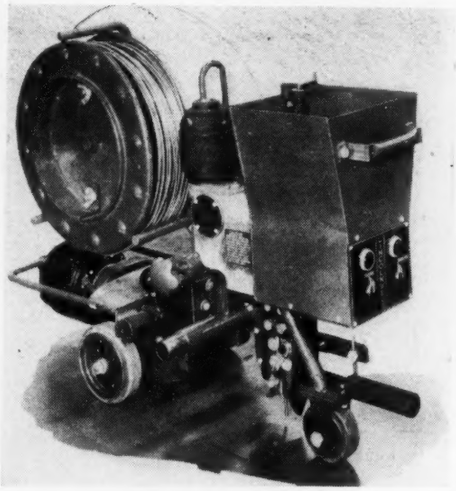
HERCULES STEEL PRODUCTS CO.

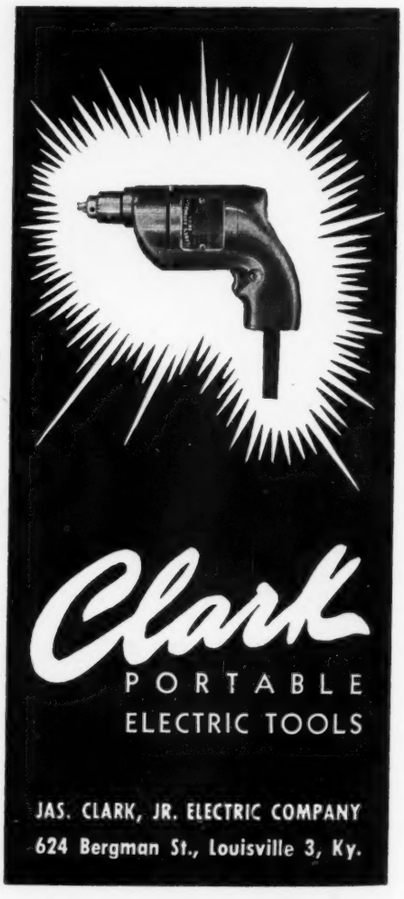
GALION, OHIO

Manufacturers of Hercules Hydraulic Hoists, Dump Bodies, Split-Shaft Power Take-Offs and "Power-Chute" Hydraulic Coal Unloaders

METALLIC ARC-WELDING PROCESS. known as "Lincolnweld" and claimed to be much simpler, faster and more economical in operation than any known existing process of automatic welding, has been developed to meet the need for a more fool proof and easier applied process for welding machinery bases and beds, ventilating fans, tanks and pressure vessels of all kinds, LST landing craft and many parts used in the prefabrication of ships, railroad cars, etc. Welds all types of joints including butt, lap, tee and fillet, as well as corner. Process designed for use with direct current, utilizing a bare metallic electrode which is fed through

(Continued on page 124)





LET 'ER TRAVEL!

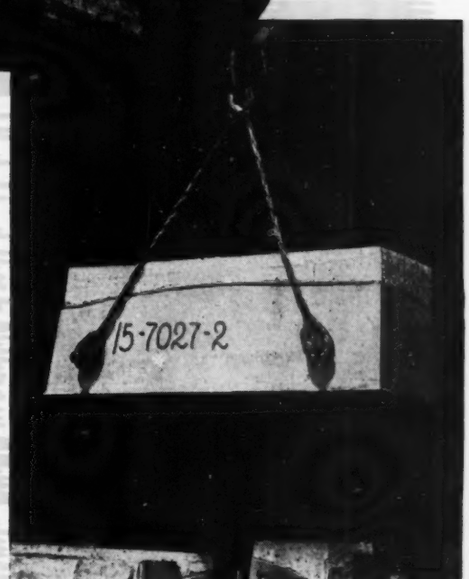
Materials move quickly... smoothly... carried by flexible YELLOW STRAND *BRAIDED* SLINGS*

When a job's moving on schedule, it's costly to have it slowed by sling equipment. What you want—in factory, shop, warehouse or yard—is *flow* in the handling of sling loads. Yellow Strand *Braided* Safety Slings promote this smoothness. Their flexibility, kink-resistance and light weight enable operators to give each lift more accurate control . . . to run a series of pickups without wasted time or motion.

Patented *braiding* puts added limberness into long-wearing Yellow Strand Wire Rope. The sling conforms to odd shapes, grips curved objects firmly, takes thimbles, turnbuckles and other fittings readily. Weighing less than chain, *braided* slings are easily carried, fastened and detached, using a minimum crew. Employees welcome their security on big tonnage lifts, their Manila-like convenience for small jobs.

Yellow Strand *Braided* Slings are practicable for loads ranging from a 40-lb. drum to a 300-ton locomotive. Send details of your application now and let B&B engineers offer a recommendation.

Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria.



RIGGERS' HAND BOOK FREE
Shows sling types, fittings, capacities. Write for your copy.

*PATENTS: U.S., 1475839, 1824671, 2142641, 2142642, 2200668; CANADIAN, 252874, 258068

ARMY E NAVY

BRODERICK & BASCOM

Yellow Strand

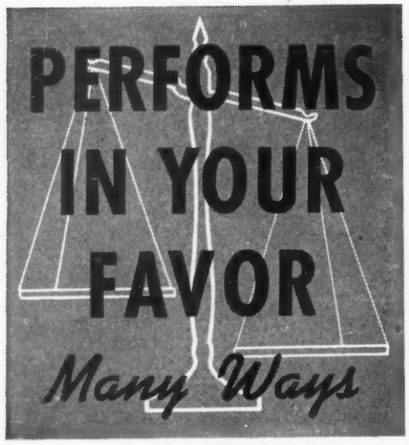
BRAIDED SAFETY SLINGS

(Continued from page 122)

a granular flux deposited on the joint to be welded. Sufficient flux is applied to blanket the arc and the molten metal completely. The unfused flux is then reclaimed for further use. Direct current, it is claimed by the manufacturer, offers many important advantages over alternating current, such as more simplified and positive control; ability to weld non-ferrous materials, and better control of electrode melting rate through option of either straight or reverse polarity. Advantages: (1) One type and grade of flux, together with one analysis of electrode, can be used with the same procedure for a wide range of steel analyses; (2) equipment will take ⅛-in to 7/32-in. electrode without changes of drive rolls, wire contacts or control. Welding head is normally used in conjunction with specially built automatic welding set of 1,200-amp. capacity. —**The Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.**

★ ★ ★

NEW SOLVENT FOR RUST, named CarboRustex, consists of several different chemicals, each of which has its individual reaction upon the rusted surface. One disperses active ingredients uniformly over the surface. Others attack grease or oil, thus permitting other chemicals to contact the rust. None of the chemicals is toxic nor injurious to the skin. The solvent is non-inflammable, may be applied by brush, spray or drip method, spreads readily and leaves no globules. It is supplied in concentrated form and for use is mixed with water, part for part.—**Carbozite Corp., First National Bank Bldg., Pittsburgh 22, Pa.**



SUPER-VULCAN
OPEN TYPE
DIFFERENTIAL-ACTING
PILE HAMMERS
18C, 30C, 50C and 80C

Sizes 18C—30C—50C—80C meet all needs

• The Super-VULCAN gives you all around pile driving efficiency. You save in steam costs as the Super-Vulcan uses 25% to 35% less steam per blow. You get twice the usual blows per minute which gives you a time advantage. Forceful blows give you greater penetration which again is a factor in time saving. Compactness makes possible easier operating. Rugged strength, simple design, and positive action saves on maintenance and attention.

The open type fits the same leads and uses the same accessories as the VULCAN Single-Acting Pile Hammer.

VULCAN IRON WORKS Since 1852
331 North Bell Avenue
Chicago 12 ---Illinois

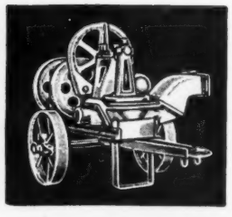
C.H.&E.

SAW RIGS

4 sizes—ripping capacity 2" to 6" lumber—gasoline engine or motor drive.

PUMPS

Diaphragm, Self-Priming Centrifugal Piston & Jetting Pumps

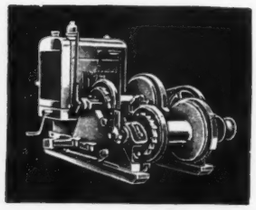


Also 3-Ton Road Roller

HOISTS

5 sizes — from 800# to 7000# lifting capacity — gasoline engine or motor drive.

Write for catalog



C. H. & E. Manufacturing Co.
3847 No. Palmer St. Milwaukee 12, Wis.

9-Piece Life Saver for Construction Men

No. 610 Util-A-Tool. 10-ton capacity. Pushes apart or pulls in 4¾" each grip. Weight 74 lbs. in metal box.

Many are the applications of the Simplex Util-A-Tool. New uses —all proving savings in time and manpower —are constantly being reported. Its 9 members are employed in many combinations to push, pull, tie forms, bind loads, clamp parts for welding, bend beams and pipe, straighten bent structural members, etc. Ask for Bulletin "P&P 43."

Templeton, Kenly & Co.
Chicago (44) Ill.

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

For the biggest nut-turning jobs

HERE'S SUPER-POWER...

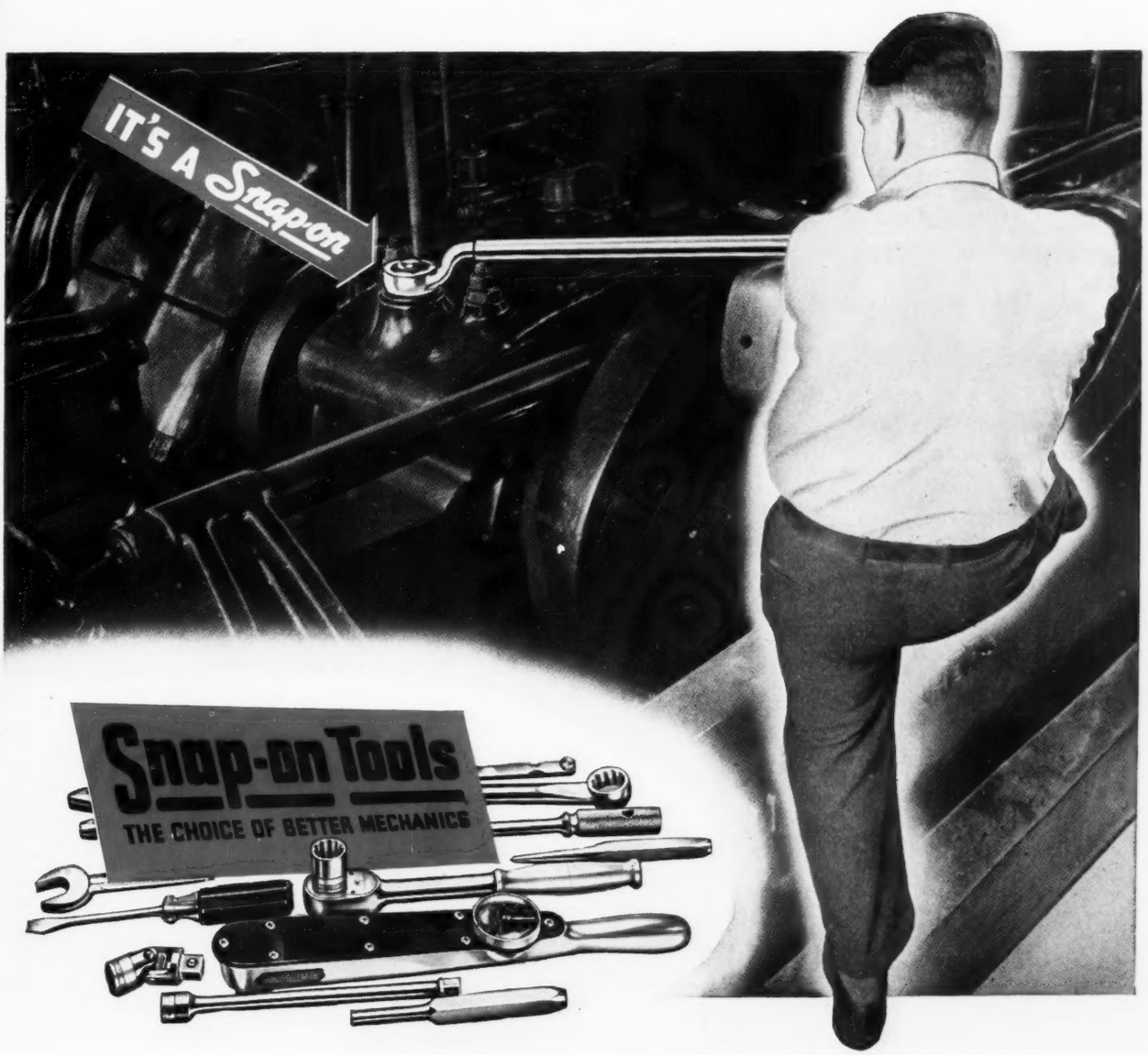
with SAFETY!

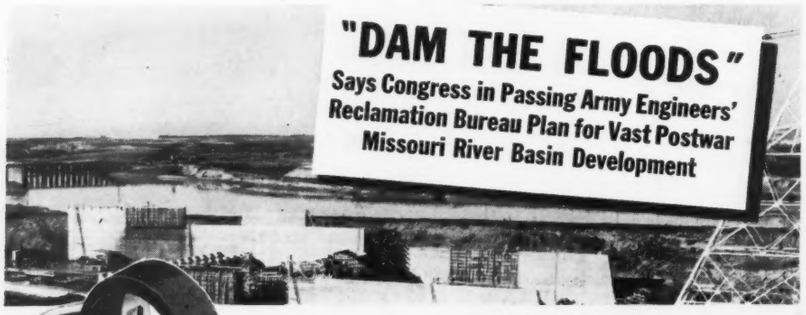
Set big nuts down *solidly*... with "beef", muscle and powerful leverage! Or break frozen ones loose instantly — there's *performance* when a Snap-on Heavy Duty Boxocket goes to work!

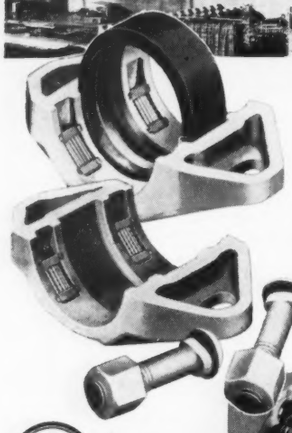
Performance plus *safety!* The boxocket opening completely encircles the nut . . . grips it on all sides . . . it cannot spread, jump or slip. The operator "lays into the job" with complete confidence in his own safety. And the compact offset Boxocket head reaches into cramped quarters inaccessible to other wrenches. The double hexagon broaching gives the advantage of a short turning arc where obstructions restrict free swinging of the wrench handle.

Snap-on Heavy Duty Offset Boxocket wrenches are available in a complete range of sizes from 1 1/16" to 3 1/8" opening, with interchangeable handles from 18" to 36" length. Write for 1945 catalog of 3,000 Snap-on hand and power tools for production, assembly and maintenance.

SNAP-ON TOOLS CORPORATION
8084-D 28th AVENUE KENOSHA, WISCONSIN




"DAM THE FLOODS"
Says Congress in Passing Army Engineers' Reclamation Bureau Plan for Vast Postwar Missouri River Basin Development



ROLAGRIP
PIPE COUPLINGS

Will Play Important Time-Saving, Cost-Saving Role on All Types of Peacetime Construction Projects

Lightweight pipe can be used since threading, grooving or flanging are eliminated. To make the time-saving, leak-proof connections, gasket is simply slid over the two pipe ends, centered over the joint and the halves of the housing bolted together. Repairs or line changes can be made quickly and safely with Rolagrips. Only plain end pipe, new or used, need be stocked.

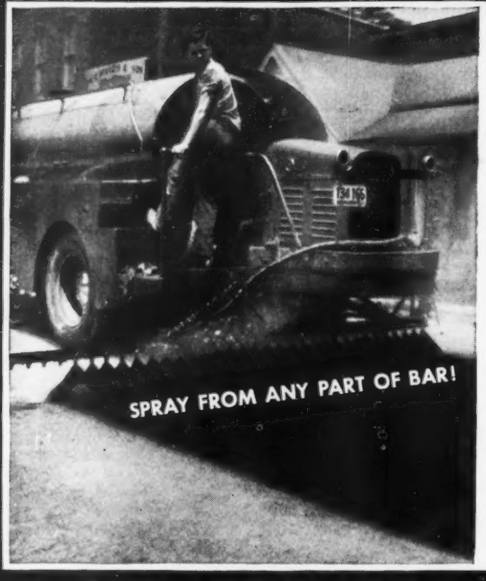
100% RECLAIMABLE

In some uses, the pipe itself may wear through completely and have to be renewed, but it is not necessary to renew Rolagrip Pipe Couplings. They are completely salvaged and used on one job after another. In addition, their flexibility and shock resistance combine to make them ideal for temporary as well as permanent lines.

G-B MFG. CO ESTABLISHED 1898

GUSTIN-BACON MFG. COMPANY
KANSAS CITY 7, MISSOURI
New York • Philadelphia • Chicago • Tulsa • Houston • Fort Worth • San Francisco

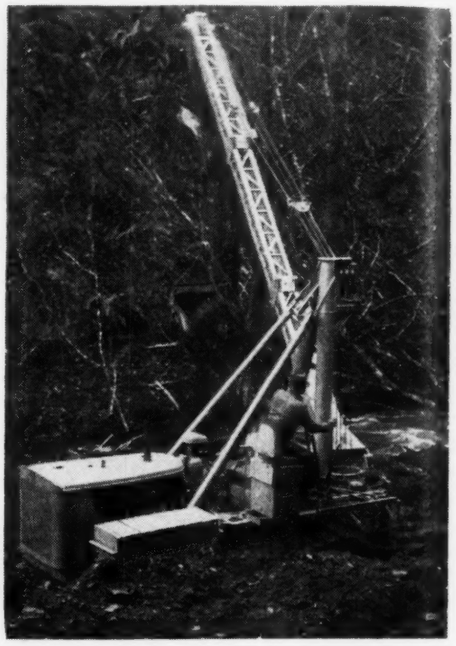
ETNYRE
"Black-Topper"
BITUMINOUS DISTRIBUTORS



Etnyre Full Circulating Type Spray Bar gives *positive control* of all valves for *instant* start and cut-off of spray . . . for spraying from *any part of bar.* When not spraying, material *circulates from end to end* of bar. Get full details on this *tried and proven* Spray Bar from your Dealer or write us direct.

E. D. ETNYRE & CO., Oregon, Illinois

TRACTOR ATTACHMENT, named "Hystaway," consists of a boom, mast and stays which may be mounted on the rear of a tractor where it is used as a dragline, clamshell, shovel, backhoe or skimmerscoop without interfering with normal tractor functions. This unit is said to have more mobility than a power shovel. Boom is backstayed



to mast pivoted at its base and the mast in turn is backstayed to the front part of the tractor roller frames through an equalizer beam and struts which have flexible connections at both ends. Thus the crawler treads have unrestricted movement and tractor springs are allowed free movement while attachment is being used.—**Hyster Co., Portland, Ore.**

★ ★ ★

SMALL CONVEYOR is a narrower and lighter unit than the Cargo conveyor which has been manufactured by this company for the last three years and is intended to handle concrete blocks, terra cotta blocks, bricks and other material of this

type. It is available in belt widths of 16, 20 and 24 in. and in lengths from 20 to 40 ft. Outstanding features of this Junior cargo conveyor are: (1) rollers which support belt are ball-bearing type, closely spaced; (2) entire unit is built as light as possible and still have necessary strength. Electric or gasoline drive is available, with provision for reversing direction of belt if desired.—**George Haiss Mfg. Co., Inc., 391 Canal Place, New York 51, N.Y.**

Isaacson

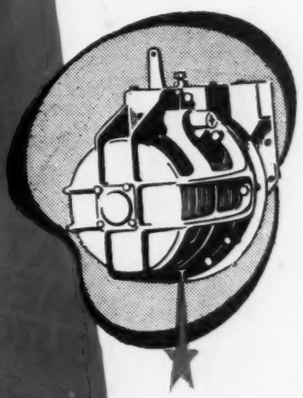
TRAC-DOZER

HYDRAULIC OPERATED

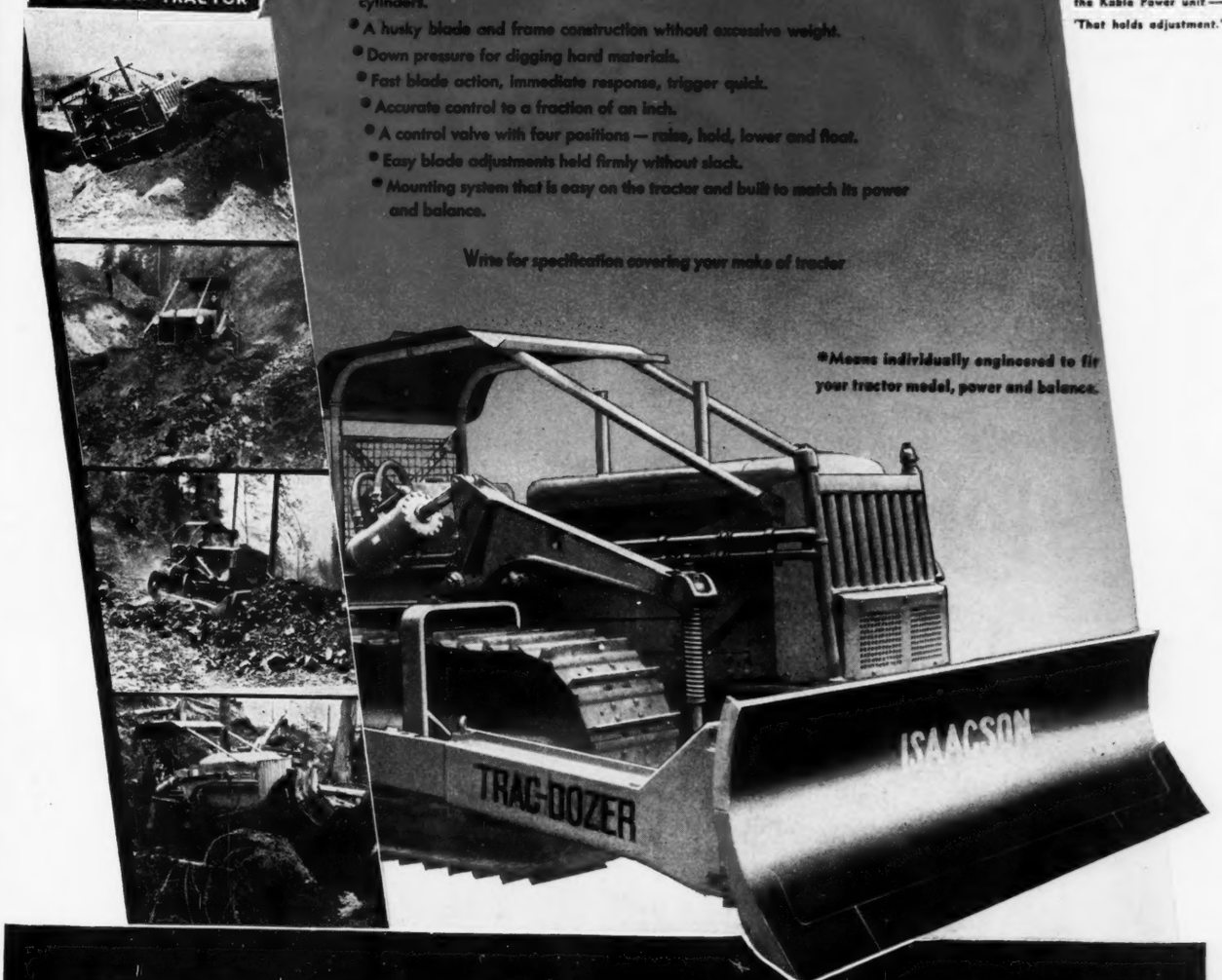
CONTRACTORS who through actual experience have compared Isaacson Hydraulic operation with others, know what you are missing. They have put these units up to punishing work schedules and will enthusiastically point out these essential features —

- A Hydraulic system that withstands rough usage and vibration.
- A heavy duty pump, oversize shaft and bearings and leakproof hoist cylinders.
- A husky blade and frame construction without excessive weight.
- Down pressure for digging hard materials.
- Fast blade action, immediate response, trigger quick.
- Accurate control to a fraction of an inch.
- A control valve with four positions — raise, hold, lower and float.
- Easy blade adjustments hold firmly without slack.
- Mounting system that is easy on the tractor and built to match its power and balance.

Write for specification covering your make of tractor



Isaacson also builds a complete line of cable-operated equipment using the Kable Power unit — 'That holds adjustment.'



*Means individually engineered to fit your tractor model, power and balance.

ISAACSON
Iron Works
SEATTLE

SAVE TIME

when your machine is down use your nearest

ASSOCIATED EQUIPMENT DISTRIBUTOR'S *service shop*

ASSOCIATED EQUIPMENT DISTRIBUTORS — MEMBER — AED

There are over 600 A.E.D. Members and most of them have additional Branch Service Shops.

This makes a vast army of workers ready to speed the necessary repair parts to your job—ready to send out welding crews—ready to regrind worn surfaces — rebuild worn drums and axles—replace bushings and pins—reshape tread pin holes or do the countless thousands of jobs necessary to keep your present equipment rolling.

Always call in an A.E.D. Service man. The symbol of this National Organization is your safeguard for reliable workmanship and square dealing.

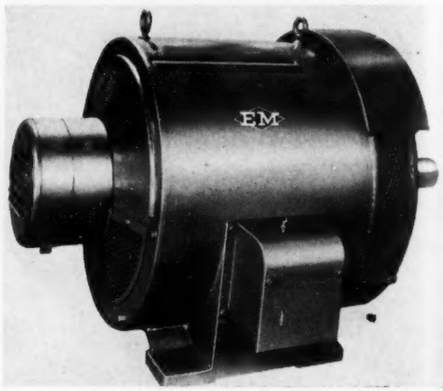
Write for additional information about other A.E.D. services.

BUY SAFELY - Buy from an A.E.D. Member

ASSOCIATED EQUIPMENT DISTRIBUTORS

NATIONAL PRESS BLDG. - WASHINGTON 4, D.C.

HIGH SPEED AC GENERATORS are built in sizes 18.7 to 125 kva., 1,800 to 514 rpm. for standard voltages, 1, 2 and 3 phase, 50 and 60 cycles, 80 percent power factor 50 deg. C. or 40 deg. C. rise and are supplied as two-bearing units for belted or coupled duty, or single bearing for direct coupling to driving engine. Drip-proof generator construction is standard. Ventilating air supplied by



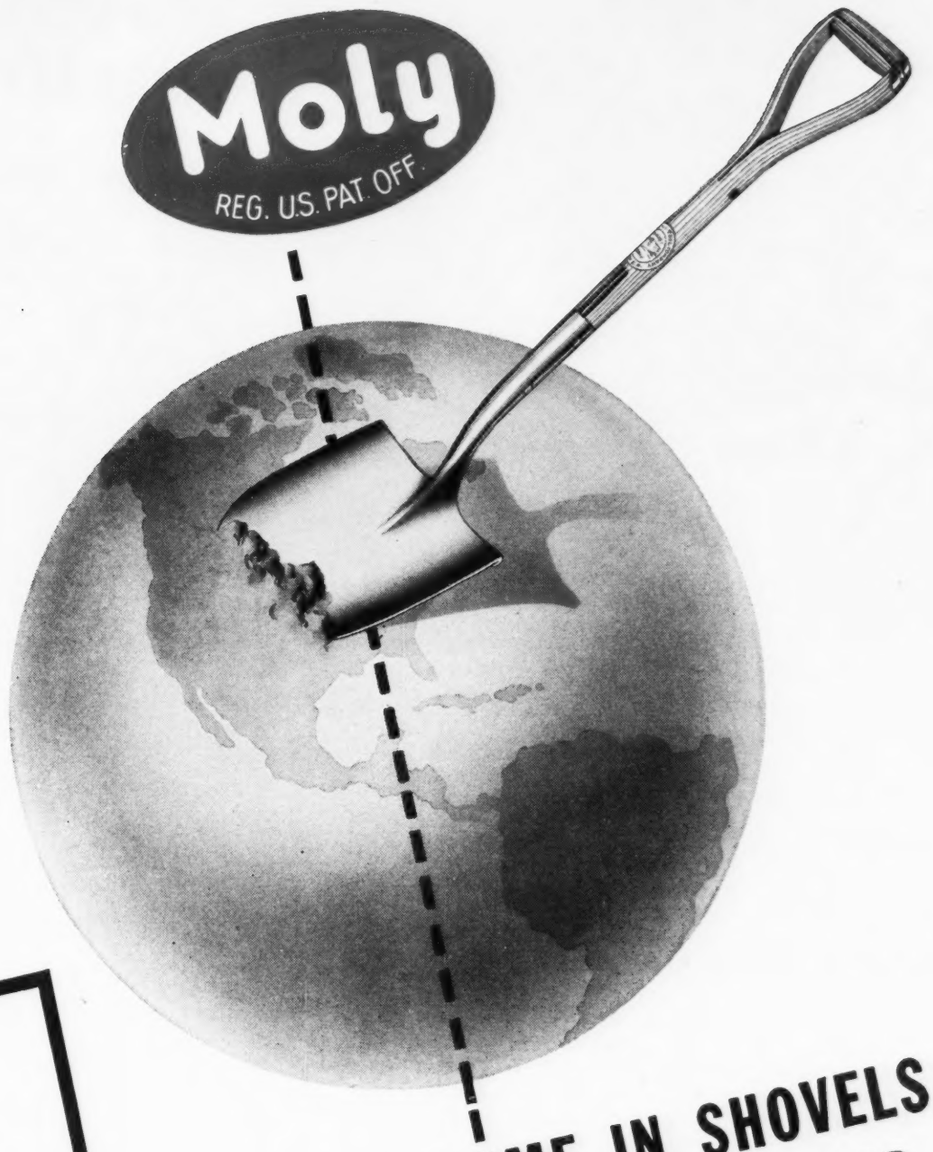
E-M "Pol-Aire" ventilating system. Section-type fan at drive end of generator pulls large volume of ventilating air through both direct connected exciter and generator. Proper ventilation of windings on field poles is assured, eliminating possibility of interior "hot spots." Intake of ventilating air is at exciter end, opposite driving engine on direct-coupled units preventing circulation of heated air. Standard dc. exciter is quill type, mounted on an extension of generator shaft, compact and of drip-proof construction. Top-mounted exciters, with protected V-belt drive, are furnished on certain speed ratings below 1,200 rpm. Generators also available in "packaged" units.—**Electric Machinery Mfg. Co., Minneapolis 13, Minn.**

★ ★ ★

ALUMINUM MALLETS AND HAMMER FACES have been developed to replace all other types of soft-faced striking tools made by this company and to provide a single mallet or hammer for every kind of work where a soft-faced striking tool is required. Besides being spark-proof and easily machined for refacing, aluminum is not brittle and

does not chip and in comparison with other materials frequently used in replaceable face hammers, it is tougher and more enduring than leather or plastics and withstands impacts better than copper or babbitt. Moreover it has the ability to absorb shocks, thereby minimizing operator fatigue. Finally it absorbs metal chips because of its lasting softness. When worn, heads or faces of aluminum are readily cut, turned and ground for longer use. Split jaw design of hammer head also assists quick replacement of faces. New aluminum faces are interchangeable with the plastic, rawhide, copper and babbitt faces previously supplied with these hammers.—**Greene, Tweed & Co., Palmetto Bldg., Bronx Blvd. at 238th St., New York 66, N.Y.**

Moly
REG. U.S. PAT. OFF.



A FAMOUS NAME IN SHOVELS

. . . Registered ALL OVER THE WORLD

Wood Moly brand shovels and scoops are internationally known wherever work is found. The Wood organization's development of Mo-lyb-den-um Alloy Steel for shovel and scoop blades has been so outstanding as to earn exclusive rights to the world-wide use of the name Moly.

Begin now to solve your post-war shovel problems by stating on every shovel order—"Wood's Moly brand shovels preferred."

THE WOOD SHOVEL AND TOOL COMPANY
PIQUA, OHIO

A National Organization Specializing Exclusively in Shovels, Spades and Scoops

Illustrated: Moly Closed-Back Shovel with Steel I-Beam Handle Reinforcement

MO-LYB-DEN-UM ALLOY
SHOVELS

ARMY
E
NAVY
At LeRoi there is a
new WHITE star
. . . our third citation for
meritorious war production
We are happy to display this additional star on our Army-Navy "E" pennant because it is an external symbol of continued excellence in war production and a tribute to our employees for the splendid job they have done. • It is also a reminder — a memorandum to construction men everywhere — that Le Roi Compressors are still going to war and winning laurels on fighting fronts. • However, there is a small percentage of Compressors, Engines and Engine Driven Generators being produced and allocated according to government regulation to those who can qualify as essential users.
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NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.

PAVING MIXER MANUAL —**Ransome Machinery Co.,** Dunellen, N. J. (103 pp., illustrated). Designed to help owner of a 34E dual-drum paving mixer get maximum service from his machine. Covers in detail three main subjects of operation, maintenance and replacement parts. Sections deal with operating controls, unloading and preparing paver for job, adjustments, hydraulic system, troubles and their remedies, cold weather operation and storage of paver. Text is profusely illustrated with perspective drawings of various parts of machine. Section on maintenance deals with installation of bearings, operation of water measuring tank and hydraulic control system and adjustments and replacements of parts. The book concludes with a complete, illustrated list of paver parts.

★ ★ ★

PLASTIC COATING—**Amercoat Div., American Pipe and Construction Co.,** Terminal Annex, Los Angeles 54, Calif. (4-p. folder, two-colors) Titled "Amercoat No. 33 Plastic Coating," this folder describes the properties, uses and benefits of general-purpose, cold-applied protective coating. Contains factual data relative to positive elimination of corrosion on equipment and structures of all kinds, as well as contamination of products resulting from contact with corroded surfaces. Technical facts presented range from application, coverage, colors, to degrees of weathering, moisture absorption and transfer, and resistance to chemical fumes, splash and overflow of acids, alkalies, salts, oils, water, etc. Many proved uses are described. Features complete list of corrosive agents to which Amercoat No. 33 is impervious.

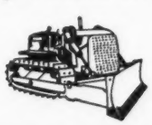
★ ★ ★

WAR CONTRACT SETTLEMENT—**Joint Army-Navy Distribution Center,** 90 Church St., New York City, N. Y. The Joint Army-Navy Termination Regulation is the "bible" for war contractors to be used in the rapid settlement of war contracts. A recent survey discloses that less than 40 percent of war contractors circularized have availed themselves of this publication. The above center has been established to distribute it, together with other printed material pertaining to contract settlement. Copies are free and may be obtained by writing to the Distribution Center, attention of Lt. E. P. Lull.

SPOTTING THE MARK

That Means LOWEST POSSIBLE COST PER YARD . . . PER TON . . . PER ACRE !

When the time comes to buy new equipment for tomorrow's earthmoving and land clearing jobs, it will pay you to remember the mark LPC, as your guide to lowest possible cost. For LPC stands for LaPlant-Choate —the *job-proved* line of tractor equipment that's known and respected the world over for its outstanding performance on *thousands* of tough jobs. Designed and built by "specialists" with over *34 years* of practical "know-how," LaPlant-Choate equipment will continue to be a step ahead in improvements that assure *lowest possible cost per dollar invested*. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.



ALL TYPES OF DOZERS*— Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.

LARGE OR SMALL SCRAPERS —Hydraulic or cable operated, front or rear dump, for use with wheel or track-type tractors.

CABLE OPERATED RIPPERS— For ripping up hard ground, shale or concrete to facilitate loading with "Carrimor" Scrapers.

LAND CLEARING TOOLS—A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all interchangeable.

LAPLANT CHOATE
EARTHMOVING AND LAND CLEARING EQUIPMENT

* Again in '44, LaPlant-Choate delivered more dozers to the armed forces and other essential users than any other company in the industry—almost as many as all the other manufacturers combined

What about tracks and tires?

Every successful earthmover knows that a big job is likely to require different kinds of machines. He uses both track-type and wheel-type tractors—whichever kind of hauling power will move the *most yards* in the *fastest time* at the *lowest cost*.

BOTH HAVE THEIR PLACE

On all jobs, traction maneuverability and drawbar power are necessary. That's where track-type tractors handle yardage fast. Where dirt has to be hauled a long distance to the fill, the higher road-speed of rubber tires is an advantage.

"CATERPILLAR" BUILDS BOTH

No manufacturer in the world has had more experience in building both track-type and rubber-tired earthmoving machinery than "Caterpillar." The great record of the "Caterpillar" track-type Tractor needs no comment. "Caterpillar" Diesel Motor Graders have rolled on rubber since they were introduced in 1931. And "Caterpillar" Diesel wheel-type Tractors have been delivering profitable high-speed performance for five years.

Your "Caterpillar" dealer offers *both* types of tractors and matched equipment. Therefore, he can give you unbiased counsel in helping you choose the right equipment for any earthmoving job. See him soon.

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ZONE YOUR EQUIPMENT FOR LOWEST COSTS ON EARTH

ZONE 1 *Track-type tractors, equipped with bulldozers and rippers.*

ZONE 2 *Track-type tractors for loading and pulling scrapers.*

ZONE 3 *Wheel-type tractors for high-speed hauls.*

CATERPILLAR DIESEL

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Sweeping into Popularity

— NEW, FASTER HIGHWAY MAINTENANCE LOADER

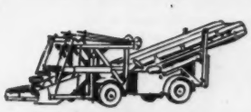
With wartime maintenance crews shorthanded and urgent jobs crying for attention, highway departments in ever-increasing numbers are looking to Athey Force-Feed Loaders to solve manpower problems and speed maintenance work.

You'll welcome the fast, clean loading job now possible with this new, modern tool. A companion unit for your "Caterpillar" Motor Grader, this self-propelled, one-man operated loader gathers up windrows of surplus material, removes it from the highway, and loads it into trucks for disposal or salvage.

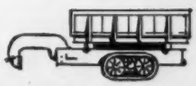
Here are just a few of the many uses you'll find for Athey Force-Feed Loaders in handling surplus material on maintenance work: Ditch cleaning, Road grading, widening and straightening, building and relocating ditches, and dressing slopes.

You'll save time and manpower . . . do more work . . . by replacing hand or other slow and expensive methods, with Athey Force-Feed Loaders. Ask your Athey-"Caterpillar" dealer for complete details, or write direct to Athey Truss Wheel Co., 5631 West 65th Street, Chicago 38, Illinois.

Athey **DEPENDABLE LOADING & HAULING EQUIPMENT**



FORCE-FEED LOADER

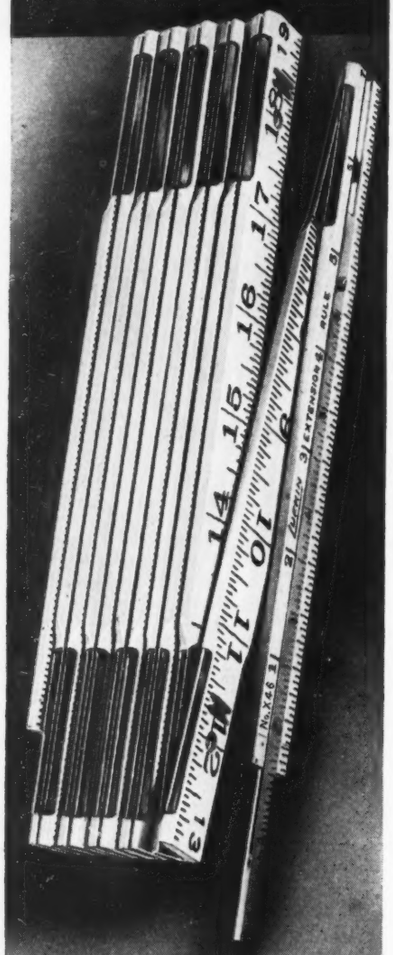


FORGED-TRAK TRAILERS

MOBILOADERS

LUFKIN

No. X-46
EXTENSION RULE



For a general-purpose folding wood rule that will take inside as well as outside measurements of doorways, windows, and other openings, you can't find a better buy than the Lufkin X-46. Here is a durable folding rule with EASY TO READ markings. Fitted with a 6-inch graduated brass extension slide that can't fall out. Buy the best—buy Lufkin. Write for free catalog.

LUFKIN

SAGINAW, MICHIGAN • New York City

TAPES • RULES • PRECISION TOOLS

TIRE USERS' HANDBOOK—**The B. F. Goodrich Co.**, Akron, Ohio. (96-pp., pocket-size illustrated) Claimed to be an especially valuable tool for all those using commercial tires, such as truck and bus operators, excavating and other contractors and industrial and warehouse vehicles, this handbook is filled with data on tires made by the company for these purposes. One section deals with eight factors which affect truck tire life: loads carried, air pressure, speed matching of duals, load distribution, rims, size and condition, wheels, brakes and springs and how vehicle is driven. Another chapter is devoted to instructions on how to mount synthetic tubes correctly and the application of synthetic tubes and flaps. Tube, valve and flap data for all size tubes are included as well as recommended practice for rims and dual spacings. Study of this handbook enables tire users to select right tire for right job; provides vital facts and data about tires, rims and wheels; recommends procedure for proper care and maintenance of tires and assists commercial operators in obtaining the lowest cost per tire mile.

★ ★ ★

WIRE ROPE CLIPS—**American Hoist & Derrick Co.**, St. Paul 1, Minn. (20 pp., illustrated) Gives full details in regard to Crosby clips and includes a table showing number of these devices to use for all sizes of rope up to 3 in. Also gives instructions, illustrated with diagram and photographs, for making a wire rope fastening properly. Ten safety features of these clips are listed.

Clean Cooling Systems!

NOW is the time to clean cooling systems of Diesel and gasoline engines. You can do this QUICKLY, EFFECTIVELY, by circulating recommended solution of Oakite Penetrant through cooling system as directed. Dirt, grease, loose scale and rust are completely removed without harm to metal surfaces or rubber hose connections. Oakite Penetrant effectively increases heat transfer efficiency . . . engines run better and smoother . . . consume less oil and gasoline.

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ARMSTRONG BROS.
BETTER PIPE TOOLS

Threads of Lathe-cut Smoothness

Machined from special oil-tempered Chrome-Vanadium Tool Steel, with hob-cut teeth "backed-off" from their ground cutting points; with accurately figured cutting angles and chaser rakes and ample chip clearance, these finer dies produce threads of lathe cut smoothness. They cut freely, faster, without drag and spin off the pipe without tearing or jamming.

Hardened, drawn, tempered and tested, they hold their keenness and free-cutting qualities.

They fit all standard made Stocks or Threaders—"Adjustable," "Receding" or "Solid"—come in all pipe sizes from ¼" to 2".

ARMSTRONG BROS. Stock and Receding Threaders are improved in design, accurately balanced and machined inside and out.

Write for Catalog

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EVEN TIGER BRAND NEEDS IT!

Add life to your wire ropes with LUBRICATION

One of the most frequent causes of premature wire rope failure is lack of proper lubrication. Yet lubrication is such a simple means of extending rope life that it seems incredible that rope users should overlook it. But they do.

Every American Tiger Brand Wire Rope comes to you from the factory, properly lubricated and ready for service. But factory lubrication, no matter how efficient, will not last the life of the rope. Field lubrication at regular intervals is absolutely essential. Wire rope is a machine, composed of many working parts. It requires periodic lubrication to reduce frictional wear.

Use a well-tested lubricant like Tiger-Lube which has been developed through years of study and research. Be sure that the rope surface is clean and that the lubricant is applied uniformly and thoroughly.

Lubrication is insurance against corrosion and is the safest way to prevent excessive internal and external rope wear. Lubrication will materially assist in controlling the wear on sheaves and drums and in prolonging rope life, resulting in increased operating efficiency.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

COLUMBIA STEEL COMPANY
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United States Steel Export Company, New York

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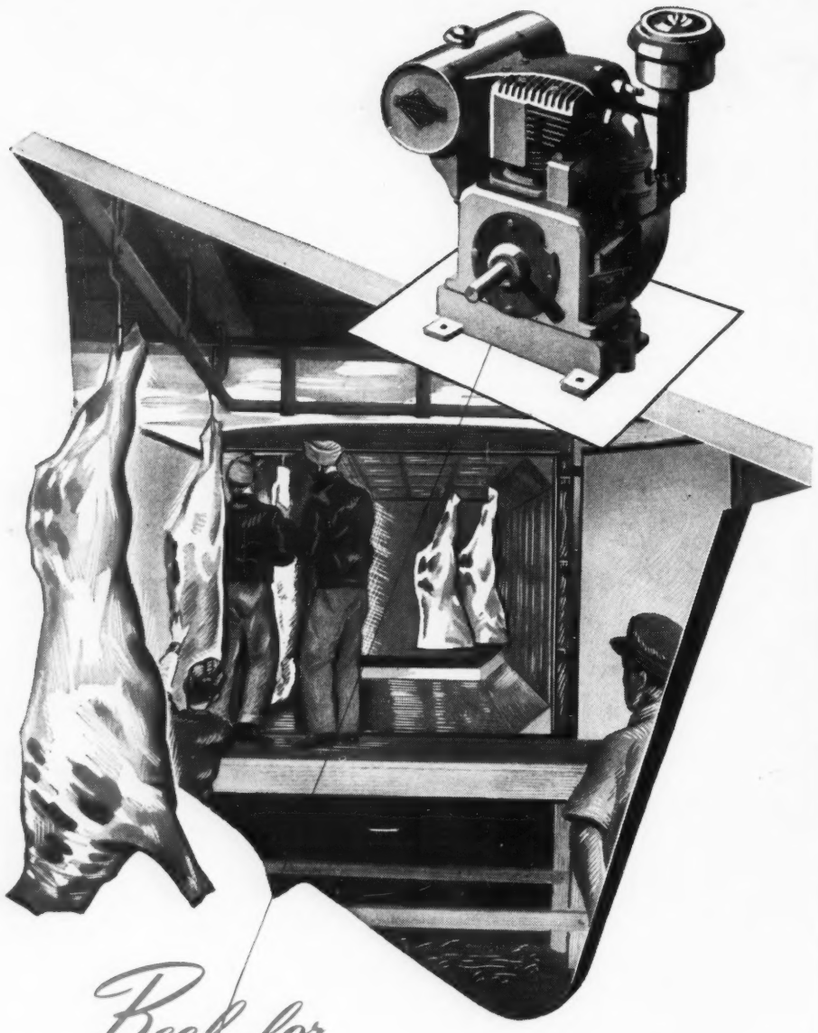
Excellay Preformed

UNITED STATES STEEL



Beef for Battling Yanks Overseas

Red meat — beef — and other perishable foods for our red-blooded, hard fighting Yanks are rushed to them in refrigerated trucks from supply depots. Refrigeration units are powered by performance-proved *air-cooled* gasoline engines — one more of many war uses for dependable, instant-starting Briggs & Stratton engines.

Air-Cooled Power

4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES

The performance records established by more than two million Briggs & Stratton engines are conclusive proof of their perfection in design, their fine engineering, and precision manufacture. Current models, and those to come, are backed by the "know how" gained through 25 years of *continuous* production of AIR-COOLED Gasoline Engines. BRIGGS & STRATTON CORP., Milwaukee 1, Wis., U. S. A.

ARMY-NAVY

ACETYLENE GENERATORS—**Air Reduction Sales Co.,** 60 E. 42nd St., New York 17, N. Y. (4-p. bulletin, illustrated) Describes and illustrates company's complete line of generators, including portable models in 15-, 30- and 50-lb. sizes with 30, 60 and 100 cu. ft. hourly productive capacity. Stationary models are available in 300- and 500-lb. sizes which deliver 300, 600 and 1,000 cu. ft. maximum hourly production. Features new Airco type "P" portable generator, incorporating an "air lift" water circulating system and enlarged radiation space between the carbide hopper and water level which eliminate the "hot belt" and provide cooler, double-scrubbed gas. Also lists sizes and packaging of National carbide for use in acetylene gas production.

★ ★ ★

HOSE COUPLINGS — **Hose Accessories Co.,** 2702 F. North 17th St., Philadelphia 32, Pa. (42 pp. illustrated). Sectionalized catalog of couplings for low and high pressure service in construction and industry. In addition to complete description of company's line of malleable iron, alloy steel and brass or bronze hose couplings, special section deals with selection of the correct hose couplings for various types of operating equipment. Service selection data has been incorporated to include hose couplings for general industrial use, pneumatic tools, piledriving equipment, discharge, water, suction hose and various other high and low pressure applications. Includes complete description of new "Safety-Lock" Universal type quick acting hose coupling which prevents accidental uncoupling under any operating condition.

★ ★ ★

CABLE VULCANIZER KIT—**Mines Equipment Co.,** St. Louis 10, Mo. (4 pp., illustrated) Describes and illustrates three types of these assemblies for use in repairing any type of round, rubber or synthetic compound covered cables in smaller sizes. Each unit is complete with heating elements, thermostatic controls, wrenches, cable holding clamps, power input cord and operating instruction manual. With proper molds splices can be vulcanized in permanent repair or jacket cuts mended quickly with rubber or synthetic compounds. Jacket insulation injuries can be mended before moisture reaches conductors. Three types described are (1) Kit box assembly for handling cables up to 1⅜-in. dia.; (2) assembly for cables and cords smaller than those accommodated by No. 1; (3) stationary bench type for industrial plant cable maintenance.

★ ★ ★

CHEMICALS AND EXPLOSIVES—**Hercules Powder Co.,** Wilmington, Del. (36 pp., illustrated) In a manner designed for easy reference, chemicals and industrial explosives are first indexed according to various industries in which they are used and then according to chemical families. An indication of many post-war applications for Hercules chemicals in plastics, paints, textiles, film, adhesives and paper is given by the booklet. Chemicals in the cellulose family, rosins and modifications, rosin esters and synthetic esters, terpene solvents and chemicals, explosives, blasting supplies and sporting powders and special products are discussed.

WALTER WALLS

J. T. LEWIS

ROBERT C. MANIX

GREENVILLE BITUMINOUS PRODUCTS COMPANY

GREENVILLE, OHIO

December 5, 1944

TELEPHONES
2-F-22
499

Littleford Bros., Inc.,
443-457 East Pearl St.,
Cincinnati, Ohio.

Gentlemen:

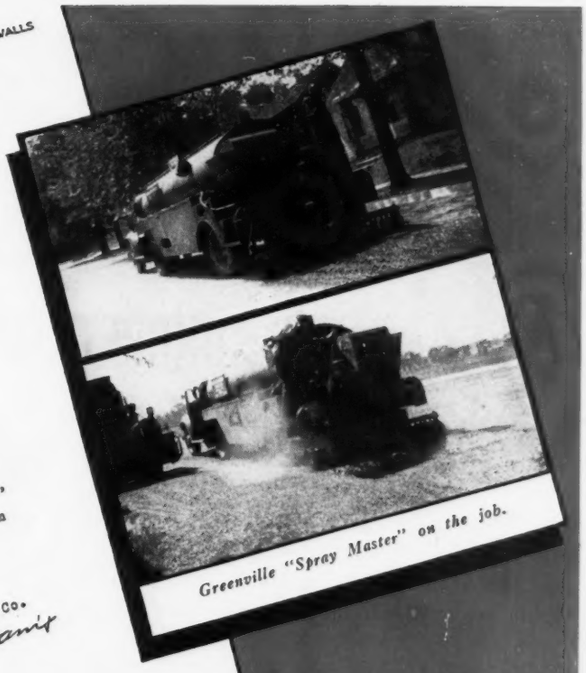
From the first of May until the first of November, we have applied in the State of Ohio for the State Highway, County and City Highway Departments a total of 807,000 gallons of asphalt, using a Littleford "Spray Master" Pressure Distributor.

We wish to inform you that this "Spray Master" did a remarkable job in applying this material. As you know, our Model CLRC "Spray Master" is four years old, and it has applied during that time many more times 807,000 gallons with the minimum of repairs.

Very truly yours,

Greenville Bituminous Products Co.

By Robert C. Manix
Robert C. Manix



Greenville "Spray Master" on the job.

807,000 GALLONS OF ASPHALT IN 6 MONTHS

One Valve Starts and Stops the Spray.

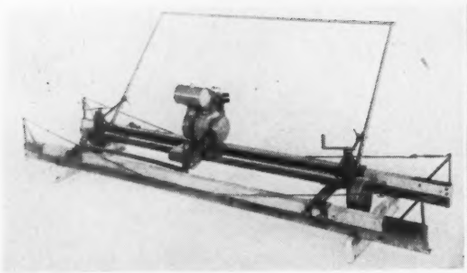
The "Spray Master" Pressure Distributor finds another satisfied user because it is simple to operate and 100% efficient when building or maintaining Roads, Streets, Highways, and Airport Runways. With the Littleford Vacuum-Flow Full Circulating Spray Bar, the "Spray Master" sprays bituminous materials accurately. The spray starts and stops instantly, no dripping or dribbling on the road. Littleford "Frameless" Constructed "Spray Master," the new feature that eliminates a trailer or truck frame, can be had in Semi-Trailer models similar to the Greenville Bituminous Products Company's unit shown here. Make your new distributor a "Spray Master."

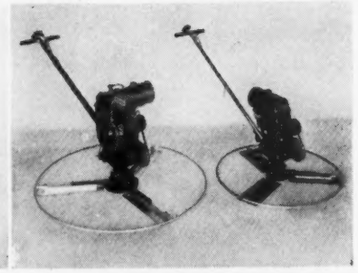
BLACK TOP ROAD MAINTENANCE EQUIPMENT
LB
SINCE - 1900

LITTLEFORD

465 E. PEARL STREET

LITTLEFORD BROS., INC.
CINCINNATI 2, OHIO





Whiteman CONCRETE EQUIPMENT

Has proved its value in saving labor and speeding construction on many national and foreign projects. The WHITEMAN Rodding Machine, the dual purpose Floating-Finishing Machines in two sizes, the Screed Stake Cap and the Hand Grill Tamper (illustrated at right) are available on properly rated orders.

For information see your nearest distributor or write direct.

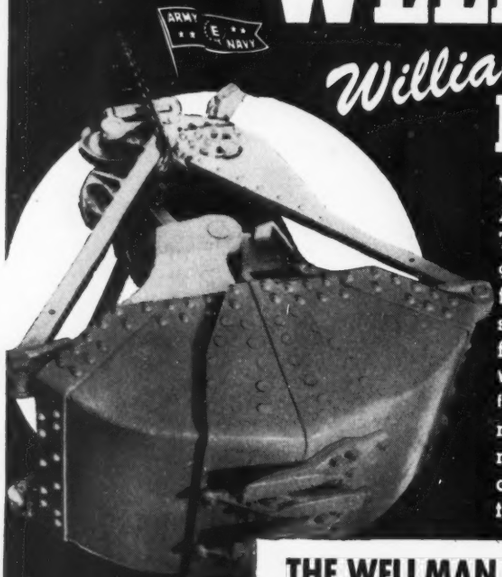
Whiteman MANUFACTURING CO.
3249 Casitas Avenue Los Angeles 26, California

Deep Digging . . .

WELLMAN

Williams

BUCKETS



Wellman Buckets, in Power Arm and Multiple Rope Types develop great digging power. They bite into frozen ground, hard clay or shale, and come up with full loads.

WELDED ROLLED STEEL CONSTRUCTION for GREATER STRENGTH and LONGER LIFE now featured in all Wellman-Williams Clamshell and Dragline Buckets — 3/8 to 16½ yd. capacities.

THE WELLMAN ENGINEERING CO.
7017 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in Principal Cities

Send for Bulletin

ONE MAN SAWMILL—**Belsaw Machinery Co.,** 3542 Main St., Kansas City 2, Mo. (16 pp., illustrated) Gives scores of testimonials, with job photographs, from users of these sawmills, whose lighter design makes possible profitable production from small logs and on small cuts. Handbook, "How to Make Lumber," gives data on dimension lumber, boards, shingles and other wood products. Most popular steel carriage outfit has 14-ft. sawing length. Its headblocks open full 26½ in. from the saw which provides for 30 in. rated and up to 36 in. overload log diameter capacity. Also illustrated and described are Belsaw gang edger, one-man planing mill, shingle-shake maker and gummer. Also available to those interested is a booklet entitled, "How to Make Lumber," a guide book to proper equipment and methods for profitable manufacture of lumber products from wood-lot lumber.

★ ★ ★

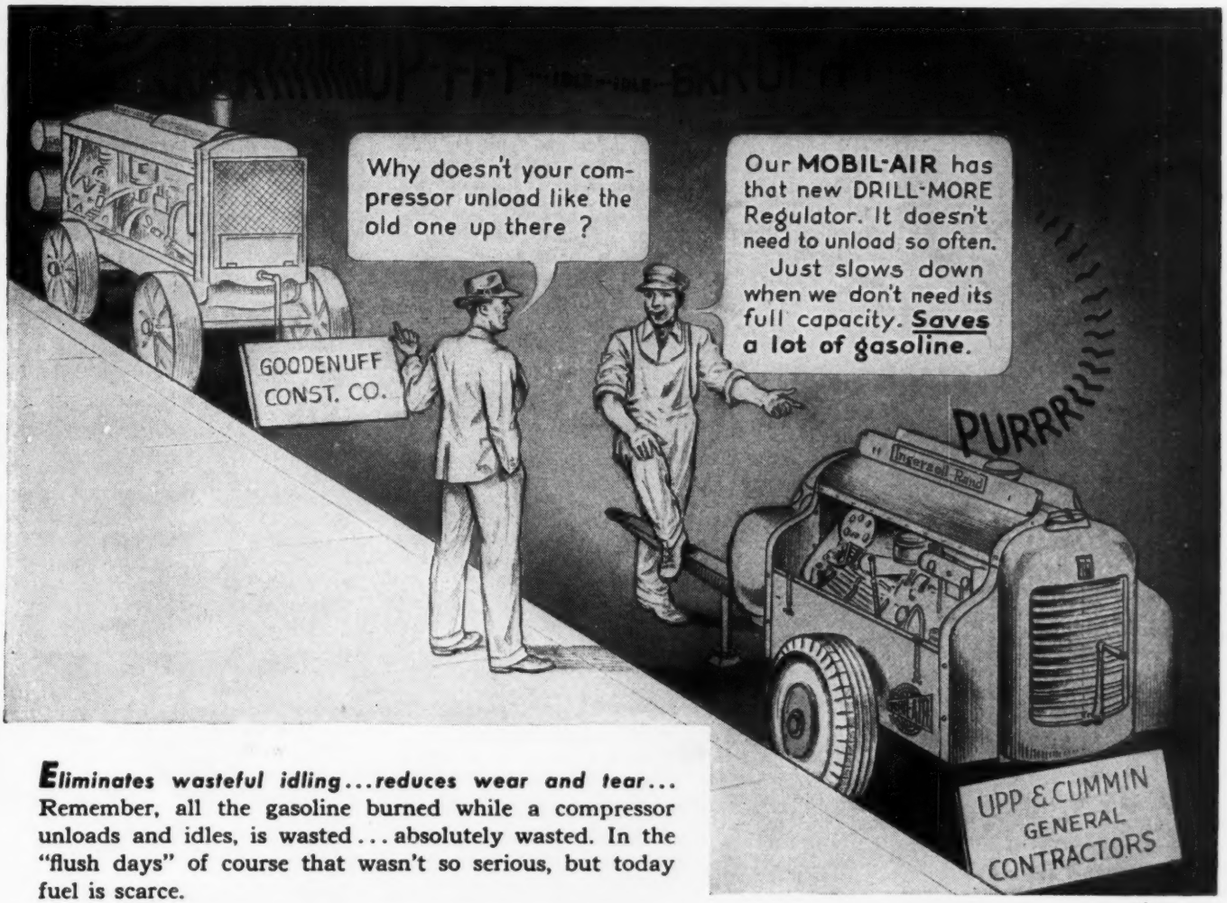
EXCAVATING EQUIPMENT AND THE WAR—**Bucyrus-Erie Co.,** South Milwaukee, Wis. (34 pp., illustrated) This is the title of a new booklet containing photographs of dozers, scrapers, dozer-shovels and other tractor equipment in action on both the war and home fronts. Gives vivid picture of earth-moving machinery as an essential weapon of war. Tells how with their tractor equipment the Allies could build airports overnight, a feat which the enemy could not accomplish because he failed to realize the importance of this equipment as a weapon of war. Copies of "In War and Peace" may be had by writing either to an International Trac-Trac-Tor distributor or to the Bucyrus-Erie Co.

★ ★ ★

HOISTING, CONSTRUCTION AND MARINE AUXILIARY EQUIPMENT—**Lidgerwood Manufacturing Co.,** Elizabeth, N. J. (26 pp., illustrated) Describes and illustrates varied line of this equipment, including hoists for contractors, steel erectors and industrial plants, logging hoists and equipment, special purpose hoists, mine shaft and incline hoists, cableways, marine auxiliaries such as winches, hoists, cable laying and winding reels, windlasses, steering engines and gear, deck capstans, steering columns and hydraulic telmotors. Also heavy construction equipment such as piledriving and derrick cars, pile hammers, tunnel shaft head frames, head sheaves with anti-friction journal boxes, electric cable haulage hoists, stone grapples and steam hatch hoists.

★ ★ ★

RADIANT HEATING SYSTEMS—**A. M. Byers Co.,** Pittsburgh, Pa. (16 pp. & cover, illustrated) New booklet, "How to Choose a Heating System for Your New Home," contains an analysis of construction costs for nine modern residences, indicating what percentage of the various investments were devoted to radiant heating systems, enabling prospective home builders to get a rough idea of the cost in considering this type of heating for their new dwellings. Other pages in this booklet review the background of radiant heating and present many facts in regard to applications in residential construction as well as factual data on operating and installation costs. Advantages claimed for this type of residential heating include: greater cleanliness, even temperatures, economical operating costs and greater flexibility in room design and decoration through the absence of radiators or registers.


Why doesn't your compressor unload like the old one up there ?
Our MOBIL-AIR has that new DRILL-MORE Regulator. It doesn't need to unload so often. Just slows down when we don't need its full capacity. Saves a lot of gasoline.
GOODENUFF CONST. CO.
PURRR
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UPP & CUMMIN GENERAL CONTRACTORS

Eliminates wasteful idling...reduces wear and tear... Remember, all the gasoline burned while a compressor unloads and idles, is wasted... absolutely wasted. In the "flush days" of course that wasn't so serious, but today fuel is scarce.

The Drill-More multi-speed regulator saves fuel not only because it eliminates most of those usual idling periods which waste gasoline, but also because the average working speed of the compressor and engine is slower and more efficient. Wear and tear is reduced... the machine lasts longer.

Fuel savings up to 40%... With the Drill-More regulator, you get 25% *more* air per gallon of fuel at half load than at full load; whereas without this regulator, you get about 80% *less* air. Because compressors running air tools operate much of the time at part loads, this feature, together with the other MOBIL-AIR economy features, gives you as much as 40% savings in gasoline consumption.

Furthermore, Jackhamers and other air tools do 15% more work than when used with portables having conventional regulators. The Drill-More multi-speed regulator maintains more uniform and higher average air pressures.

Be sure your next portable has these features

- ***Multi-speed regulation***
- ***Convertible engine***
- ***Electric cranking with commercial 6- or 12-volt equipment***
- ***Light weight, rugged construction***
- ***Small over-all dimensions***
- ***Easily maintained clutch***
- ***Unified assembly of engine and compressor***
- ***Spring mounting & automotive steering on larger sizes***
- ***Proven design & performance***

Ingersoll Rand
Ingersoll-Rand
11 BROADWAY, NEW YORK 4, N. Y.

MOBIL-AIR
AIR POWER

The Portable that Saves Fuel...Time ...Money

2-436

COMPRESSORS • AIR TOOLS • ROCK DRILLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • OIL AND GAS ENGINES

Cable repairs, so important in electric cable maintenance, can be made quickly with a MINES Kit Box Vulcanizer Assembly. Makeshift, temporary repairs to cables, often dangerous to life and property, are a thing of the past with a Mines Kit on the job.

The Kit Box Assembly VDIR 213, shown above, will handle cables up to 1⅜" in diameter and will accommodate a mold up to 13" in length. Comes packed in a sturdy, light steel carrying case, 23" x 15¾" x 13", and weighs about 120 pounds. Easy to move to cable trouble. Total heating capacity 1200 watts, operates on 115 volts AC.

This portable Kit Box contains all necessary supplies and tools. The Vulcanizer itself is mounted right into the Kit Box. Each unit is complete with heating elements, thermostatic controls, cable holding clamps, power input cord, wrenches, and an operating instruction manual.

Also available in smaller size and Bench type. We also make Vulcanizers for all size cable and electrical conditions. Write for Bulletin RV-104K.

MINES EQUIPMENT COMPANY
4245 CLAYTON AVE.
ST. LOUIS 10, MISSOURI

Makers of the Connector with the Water-Seal

BUILDING MAINTENANCE—**The Truscon Laboratories,** Detroit 11, Mich. (two 4-p. folders, illustrated) Two new pieces of literature Bulletin 553, "Modern Glazing With Truscon 'Tite-Lite,'" and Bulletin 558 "Saf-T-Dek Floor and Deck Covering," are now available for inclusion in the loose-leaf Truscon "Blue Book" of building maintenance. Also available for the asking is a contents sheet which lists all the up-to-date literature in the Blue Book and serves as a check for any missing material which will be supplied upon request.

★ ★ ★

MAINTENANCE WELDING—**Eutetic Welding Alloys Co.,** 40 Worth St., New York 13, N.Y. (6 pp., illustrated) Describes uses of low temperature welding rods concentrating on problems which concern maintenance and showing how these rods, applied at low temperatures to cast iron, steel, aluminum, bronze and other metals produce clean, strong bonds, leaving welded part easily machinable. Strength of machined part is said to be unimpaired, no distortion occurring, an important consideration in repair work. Many suggestions included for salvaging parts which were thought ready for junk pile and putting them to work again.

★ ★ ★

AIR-OPERATED TOOLS—**Ingersoll-Rand Co.,** 11 Broadway, New York 4, N. Y. (Pocket-size folder, illustrated) Describes and illustrates uses of these tools in maintenance, construction and demolition operations and shows the busy man at a glance the line of Ingersoll-Rand air tools and portable compressors available for speeding up his job. Representative models only are pictured, although ample information is given as to size ranges and model variations. Several photographs show new uses for well-known tools. Various accessories to air-tool operation also are shown, such as hose couplings, airline lubricators, steels and jackbits.

★ ★ ★

SHAFT COUPLINGS—**Link Belt Co.,** 307 N. Michigan Ave., Chicago, Ill. (8 pp., illustrated) Describes and illustrates complete line of shaft couplings giving sizes, dimensions and list prices for couplings of flexible, rigid flanged face and compression types with special emphasis on the type RC roller chain coupling. Detailed information also is given on protective casings for RC coupling. This includes two styles of revolving casings (R and P) and a type S stationary mounted casing. Type P is a plastic casing; others are made of steel.

★ ★ ★

RUST PREVENTIVES—**Sinclair Refining Co.,** 630 Fifth Ave., New York 20, N. Y. (4-p. folder) New, war-developed rust preventives and their application for reduction of rust losses in industry are discussed in this presentation entitled "Service Factor," and information is provided about the proper type of preventive and method of application for protection of external surfaces, bearings and other moving parts, engines and automotive vehicles. Treatment covers idle machinery and equipment in storage and in transit. Preliminary treatment necessary before application of rust preventives is outlined. A useful chart identifies various rust preventives with government specification number preventives.

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Ordinary vibration won't provide the fast concrete placement that cuts schedule time. *VIBER-ation will!* 9500 RPM in concrete—3 kinds of power, ruggedness, portability. Switch to

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Light enough to handle . . heavy enough to "take it". These HIGHLY PORTABLE CMC's have proven their durability and sturdiness on important jobs all over the world. They are "first choice" Mixers in peace or war. All standard sizes. Get information.

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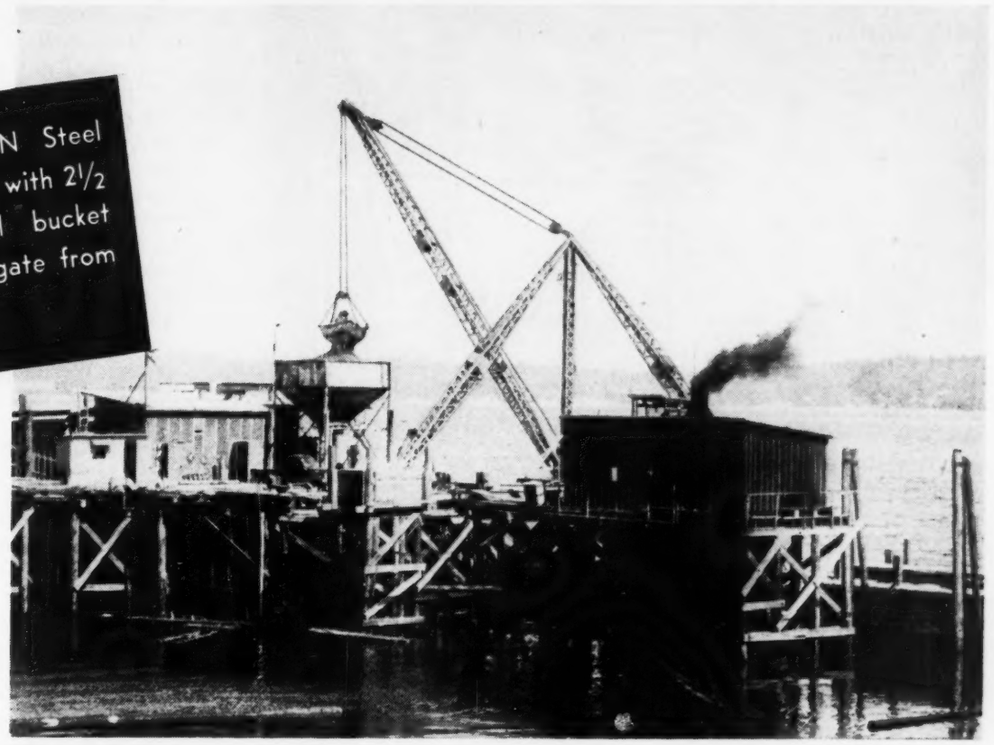
Waterloo, Iowa
Mixers • Pumps • Hoists • Batching & Placing Equipment • Saws • Carts • Barrows

American DERRICK ON CONSTRUCTION MATERIALS HANDLING



AMERICAN Steel Stiffleg Derrick with 2½ yard clamshell bucket unloads aggregate from a barge.

For materials handling with hook or bucket on construction projects, modern design AMERICAN Steel Derricks offer reach and lifting capacity at low initial investment. Their construction permits maximum load capacity with minimum weight, and simplifies erection, dismantling and transportation.

There are a lot of derrick jobs and there is an AMERICAN Steel Derrick for every one of them. In the Guy, Stiffleg, Steel Erectors and special types of AMERICAN designed and built derricks, AMERICAN has the derrick for your requirements.

Now is the time to look into your derrick requirements.

4310

Plan now . . . but wait for **AMERICAN!**

AMERICAN MATERIALS HANDLING *for* EVERY INDUSTRY

AMERICAN HOIST & DERRICK CO.

Saint Paul 1, Minnesota

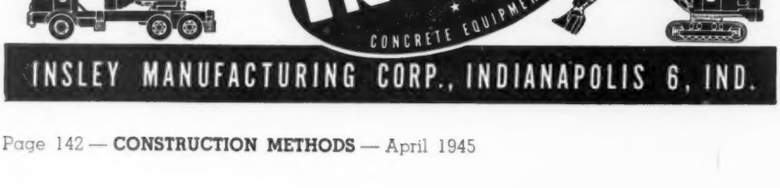
CHICAGO SAN FRANCISCO NEW YORK

Wherever wire rope is fastened . . . . use genuine **CROSBY CLIPS** *with the Red-U-Bolt*

Effective Crowd Control

Regardless of the material being handled, Insley Excavators save time on the job. Crowding speed is under perfect control at all times . . . fast or slow to provide whatever crowding pressure operating conditions require. Faster retraction is obtained by the reversible, two-speed front drum. Boom can be raised or lowered without adjusting the crowding drive.

This is but one detail of Insley design and construction that contributes to reduced dirt or rock moving costs . . . but one of many reasons why it will pay you to consider Insley Excavators for new equipment needs when production for civilian use can be resumed. Write now for specifications on the Insley Excavator . . . ⅜ and ½-yd. sizes . . . six easily interchangeable attachments, shovel, trench hoe, basement hoe, dragline, clamshell and crane.



INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

Parts Department

(Continued from page 81)

market. With the help of an engineer in Denver who has made this type of wartime production a specialty the plow was completed in time for the job.

Two rock crushers we are now using we built in our own shop. All the parts and equipment sections came from our own stock of salvaged material. The hoists on two of our large pavers were made in our own shop. No new equipment went into building them except the wire cable.

Our salvaged inventory includes several thousand feet of wire rope. This has been repaired and graded, waiting for reuse. We find that we get better second use from preformed cable than from the non-preformed. There is less loss in cutting back and in applying new fittings. Because the preformed will not kink, practically no splicing is required in conditioning a used preformed cable. We are using a number of different brands of wire rope. The last two years we have been specifying preformed on new orders. We will continue to do this during 1945. We have found also that we get better second and third life from all-steel clips and fasteners. There is less damage to the rope and the steel clips can be cleaned and returned to the parts bin to a much better advantage than cast clips.

We have substituted wire cable for chains on a number of pieces of equipment which have been rebuilt. An example of this is a 4-ton conveyor. This piece of equipment comes equipped with chains. With the first rebuilt job we had trouble with the chains knotting and breaking. Since we made the needed corrections for the change to cable we have had no more trouble.

This cut-and-try method of experimentation will continue until after the war. And we will continue to learn new jobs that we can do in our own machine and repair shop. As our maintenance and service program is broadened we will make the necessary changes in the parts department.

It does not seem to me that 1945 will bring any bogey with which we of the parts and stock department cannot compete. We are expecting to meet some new replacement demands. On all demands which can be filled by jobbers we will continue to specify: (1) Equipment and parts which we have found give us the best life record; (2) Equipment which our experience shows has required the least

(Continued on page 144)

Q { Will "M.P.T."* Help You Win Profitable Contracts?

A You bet it will. "M.P.T."* per machine and man-hour means lower costs and a lower, winning bid. For instance: a contractor suspected he was losing valuable time lubricating his machines. The Alemite Lubrication Specialist recommended power lubrication that was brought *to the job.* Now, he lubricates track roller bearings in 2½ seconds—fills transmission and final drives at the rate of 14 pounds per minute! Checked your lubrication times lately?

**More Productive Time*

Q **Does "on the job" lubrication save on lubricants?**

A And how! This contractor was not only using too much time for lubrication but he also thought he was wasting lubricants. So, he got an Alemite Portable Service Station. Using this "barrel to bearing" method of applying lubricants he saved 19% on consumption of grease and oil. Every bearing got clean, uncontaminated lubricants and in far less time! It's savings like these that can make "low bid" contracts profitable.

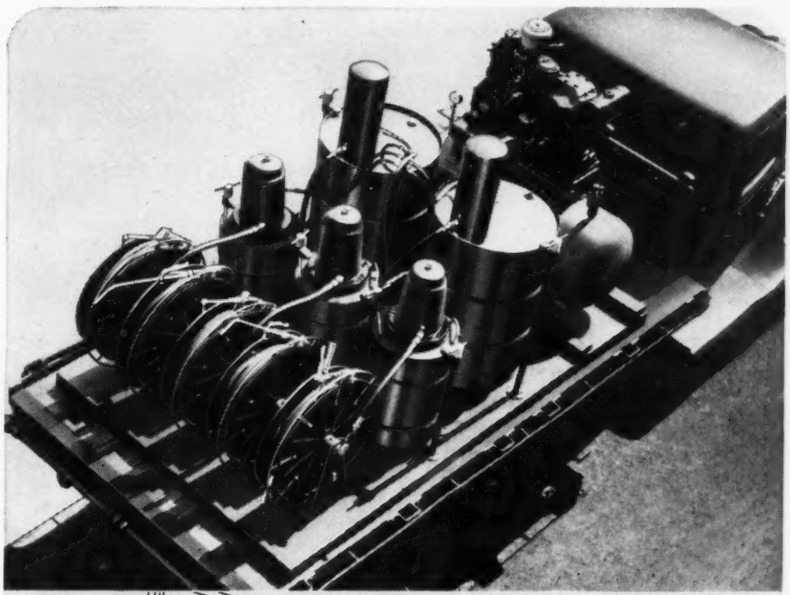
Alemite Portable Service Stations Mean "Power Lubrication" On the Job!

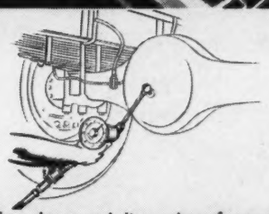
• Less idle time of equipment awaiting lubrication. Fewer parts failures due to improper lubrication. It all adds up to greater profits on every job because machines produce more per day!

Alemite Portable Service Stations provide high pressure power lubrication for all bearings equipped with pressure gun fittings; rapid filling of gear housings, final drives, rear axles, transmissions and crank cases.

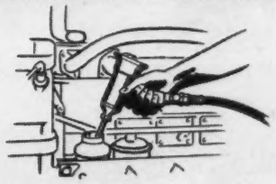
They're used for tire inflation, engine cleaning and paint spraying. The complete unit includes high- and low-pressure Alemite Barrel Pumps, Alemite Oil Dispenser, hose reels and gas engine powered air compressor. And, the savings they make in money, time and machines can make a big difference in your meeting the competition ahead.

FREE! Illustrated catalog describing Alemite Portable Service Stations. Also, complete catalog of individual Alemite lubricating equipment. Send coupon for your copies.





Quick and metered dispensing of gear lubricants to gear housings, transmissions, final drives, etc.



No time or oil wasted in filling crankcases with the amounts desired.

ALEMITE

First in Modern Lubrication

CONSULTATION • ENGINEERING • EQUIPMENT
LUBRICANTS • MAINTENANCE

Stewart Products of STEWART WARNER

ALEMITE, 1840 Diversey Parkway, Chicago 14, Illinois
In Canada: Belleville, Ontario.
Please send FREE catalog on
☐ ALEMITE PORTABLE SERVICE STATIONS
☐ ALEMITE INDUSTRIAL LUBRICATING EQUIPMENT

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Making Pressure Pipe SAFE with LOWELL REVERSIBLE RATCHET Wrenches

Applying uniform tension to the bands on woodstave pipe is just one of a multitude of jobs best handled with LOWELL RATCHET WRENCHES.

THE "OLD RELIABLE"

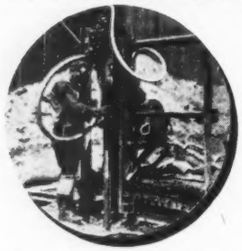
Bridge work, bolted steel frame building construction, electric tower erection and sub-aqueous tunnel work are just a few of the many jobs where LOWELL Wrenches are preferred on account of their STRENGTH and SAFETY.

SEND FOR THE LOWELL CATALOG TODAY

LOWELL WRENCH CO., WORCESTER 8, MASS.

1869 *Serving the Construction Industry for 76 Years* 1945

FOR *Engineered* QUALITY SELECT REPUBLIC CONTRACTORS' SUPPLIES



Road Hose • Air Hose • Water Hose • Suction Hose • Mud Jack Hose • Grout Hose • Cement Placing Hose • Steam Hose • Welding Hose • Mill Hose • Flexible Sleeves • Pump Diaphragms • Packing • Conveyor Belting • Elevator Belting • Hi-grader Belting • Transmission Belting • V-Belts.

HOSE and belting construction has been studied by Republic technologists, and every type has been designed for specific use. Therefore, you are assured of long, economical service under severe working conditions which usually prevail. Ask your Republic Distributor about these rubber products.

REPUBLIC RUBBER

DIVISION

LEE RUBBER & TIRE CORPORATION

YOUNGSTOWN 1, OHIO

REPUBLIC INDUSTRIAL PRODUCTS YOUNGSTOWN, O.

LEE DELUXE TIRES AND TUBES CONSHOHOCKEN, PA.

(Continued from page 142)

service; (3) Equipment which has the greatest salvage value—that is, we will take into consideration the second life after the retired equipment has gone through our repair shop and has been returned to the parts and stock department.

★ ★ ★

Concrete Pile Jetting

(Continued from page 71)

which these piles could be driven by the jet was an important item in a wharf when so many piles are in close proximity.

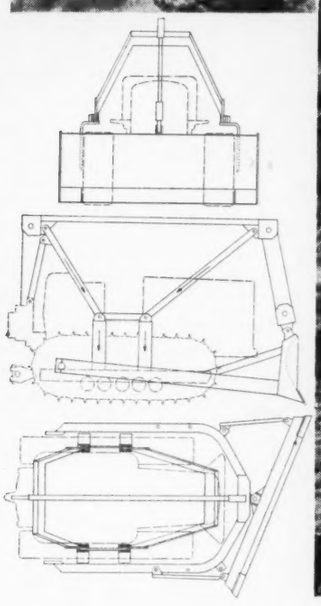
Floor Construction

After the pile tops had been cut off to grade, which was done from wooden platforms resting on supports bolted around the piles, forms were placed and the floor system of beams and stringers was poured, using concrete mixed in a central mixing plant from materials delivered by barge. The concrete was conveyed from the plant to the forms in truck-mixers with a gravity discharge to skips. The skips moved across the pier on an overhead monorail suspended from a 98-ft. gantry truss spanning the full width of the pier. The bottom chord of this truss cantilevered beyond the supports at one end, thus enabling the skip to roll into position out over the truck roadway for receiving its load from the mixer-truck. The floor slab was placed in a separate pour after completion of other parts of the floor system.

Direction

The pier was built under the direction of the chief of the Bureau of Yards and Docks, Vice Admiral Ben Moreell, CEC, USN. Rear Admiral C. A. Trexel, CEC, USN, is the superintending civil engineer for Areas VII and VIII, and represents the chief of the bureau in this area on all construction work. Capt. E. B. Keating, CEC, USN, public works officer for the Navy Yard, is the officer in charge of construction, and was assisted by Lieut.-Comdr. Joseph C. Bronson, CEC, USNR. The contract was held by the Manson Construction Co., Seattle, Wash., Walter Peterson, general superintendent, and Howard C. Flanagan, resident engineer.

SOUTHWEST
Cable Dozers



ANY WAY YOU LOOK AT IT . . . front, side or top . . . it's the slickest thing on two tracks. The "A Frames" and TWO "Over Center Track Mounted" brackets distribute the load evenly over the entire track frame, utilizing maximum tractive effort. No twisting, teeter-totter, action here.

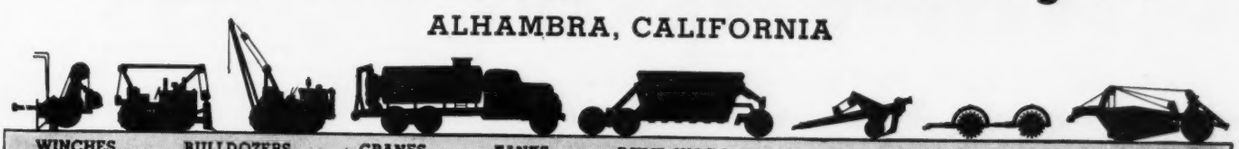
MANY ADVANTAGES are also offered by Southwest Single Cable Controlled Rear Dump Hauling Scoops. Combination dozer-scoop hook-ups like the one pictured above are very popular—especially when both can be operated from one double drum Power Control Unit. Write for complete literature.

REMEMBER TOO, Southwest builds for all four makes of track-type tractors.

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA



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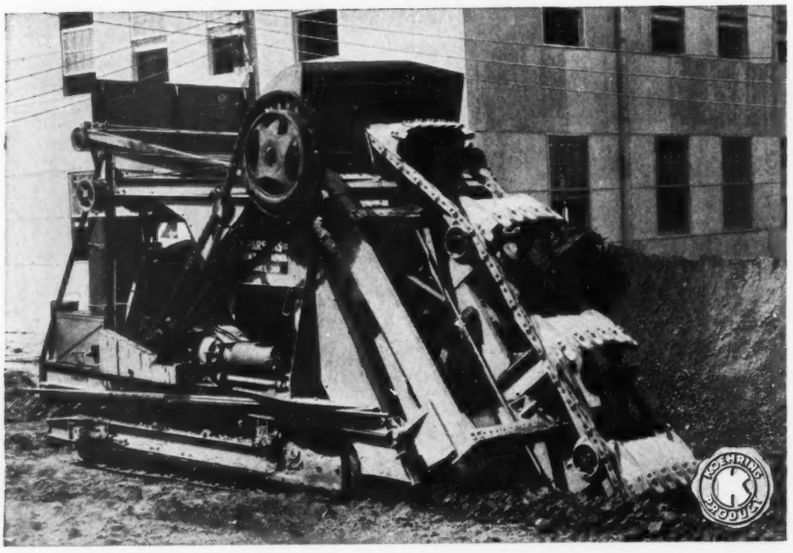

PARSONS 310 TRENCHER KEEPS DIGGING COSTS DOWN

On pipeline jobs, sewers, gas and water mains, Parsons 310 Trenchers keep costs down, profits up. Built-in strength makes every pound of weight pay off in extra hours of heavy duty trenching. Engineered-in features get around trenching problems that stop less versatile machines.

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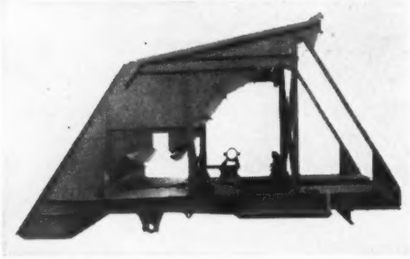


A reinforced frame, welded and riveted of heavy steel ship channels and angle bars, is the foundation around which the 310's strength is built.

STRENGTH:

- ★ Rib-reinforced Buckets
- ★ Chrome Vanadium Teeth
- ★ 90 H. P. Motor
- ★ Cast Steel Conveyor Frame
- ★ Enclosed Gearing

VERSATILITY:

- ★ Telescoping Boom
- ★ Shiftable Arc Conveyor
- ★ 45 Traction Speeds
- ★ 8' to 136' Digging Speed
- ★ Shiftable Boom

THE PARSONS COMPANY

KOEHRING SUBSIDIARY **NEWTON, IOWA**

TRENCHING EQUIPMENT

New Engineer Equipment

(Continued from page 55)

ported as fixed spans on adjustable steel trestles. Pontons are 33-in.-dia. rubberized canvas tubes made up into units 8 ft. 3 in. wide by 33 ft. long. The tubes are divided into a series of airtight cells as a safeguard against strafing.

A ponton, weighing about 975 lb., can be inflated and launched, ready for use, in less than 5 min., and a floating bridge can be constructed at a rate of 480 ft. in 2 hr. 15 min. Each treadway bridge company of Engineers carries equipment in special bridge trucks and 14 2½-ton cargo trucks sufficient for 864 ft. of bridge. The bridge truck is a special 6-ton unit equipped with a power crane for handling and placing heavier parts of the bridge.

Airplane landing mats of aluminum alloy were developed to save weight in shipping by air. Pierced-plank-type aluminum mats 10 ft. long by 15 in. wide, formed of 3/16-in. sheets, are comparable in strength to steel mats but weigh only 31.8 lb. per panel as against 63.9 lb. for steel. Aluminum mats for a 150x5,000-ft. runway have a total weight of 975 tons and can be shipped in 163 loads on cargo planes. Speed of laying the aluminum mats is said to be 250 sq.ft. per man-hr., as compared with 150 sq.ft. for steel.

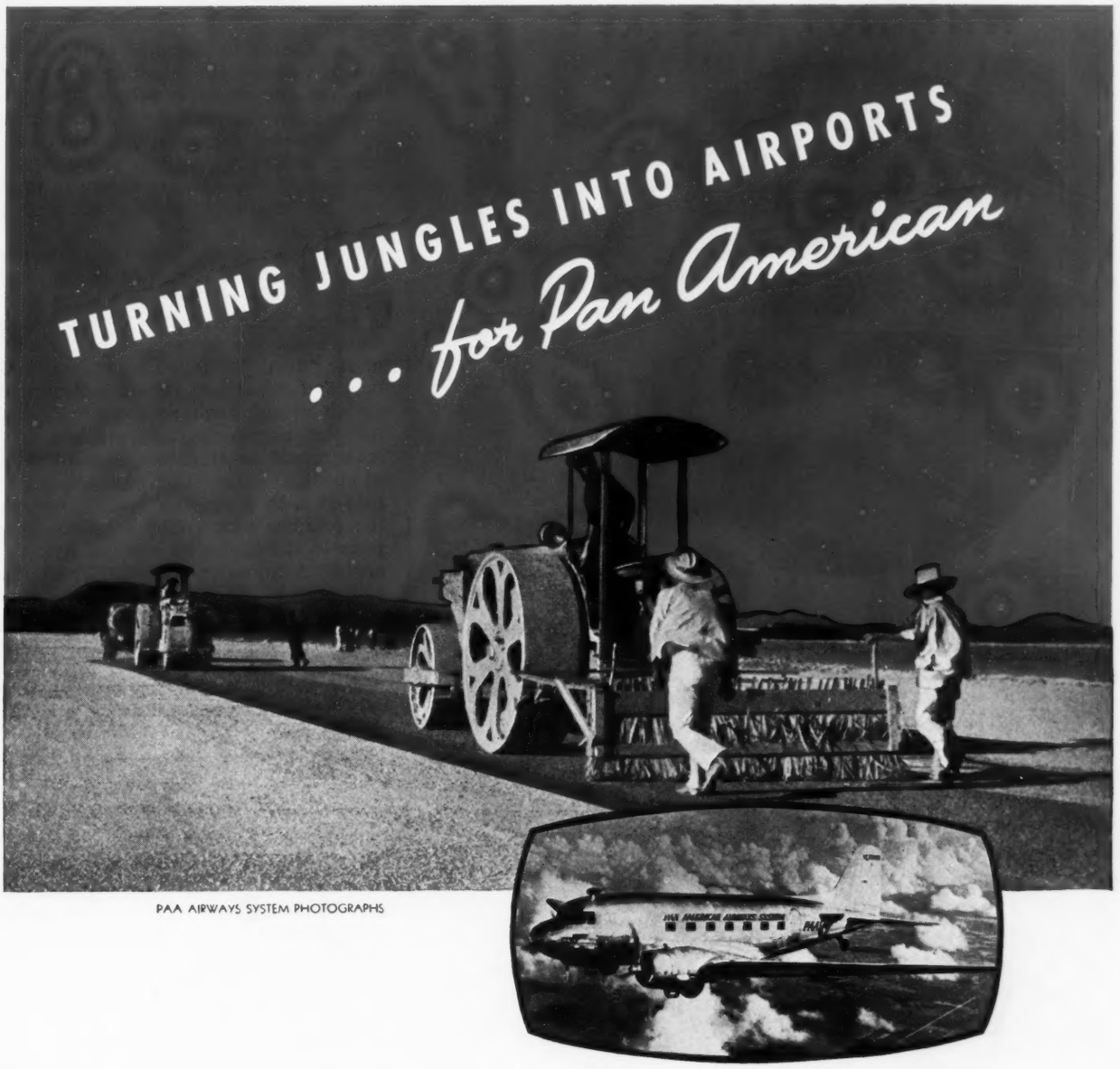
★ ★ ★

Pavement Widening

(Continued from page 85)

even though the old pavement is cracked considerably. A badly cracked condition may be found in old portland cement concrete on plastic clay soil, particularly on flat grades which are poorly drained, and old pavements in this condition will require considerable reconditioning before being topped with a thin course of bituminous concrete. To correct poor drainage in such circumstances, pipe or French

(Continued on page 148)



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(Continued from page 146)

drains should be installed at the sides of the pavement and should be extended through the shoulder where "pumping" joints show the need for subgrade drainage. Placing comparatively thin resurfacing over "pumping" joints without providing the necessary drainage to correct the condition is wasteful and extravagant.

It is essential that cavities underneath an old pavement be filled before resurfacing is placed. Teetering slabs can be anchored and "pumping" joints plugged from below by forcing suitable material under them. Soil mixtures containing portland cement or, occasionally, asphaltic materials, have been generally used for this purpose within the last 15 yr. As a recent development, asphalt cement of about 35 penetration now is being employed with promising results, following the practice adopted by a railroad company in stabilizing its roadbed by forcing asphalt into water pockets. The hot asphalt is pumped through a hose and suitable nozzle from an ordinary distributor. Recent work indicates a cost of about 16c. per gal. for the asphalt cement in place.

Large open joints and cracks, as well as depressions in the surface, should be filled with a fine-graded bituminous concrete or sheet asphalt mix.

Seal Coat on Cracked Pavement

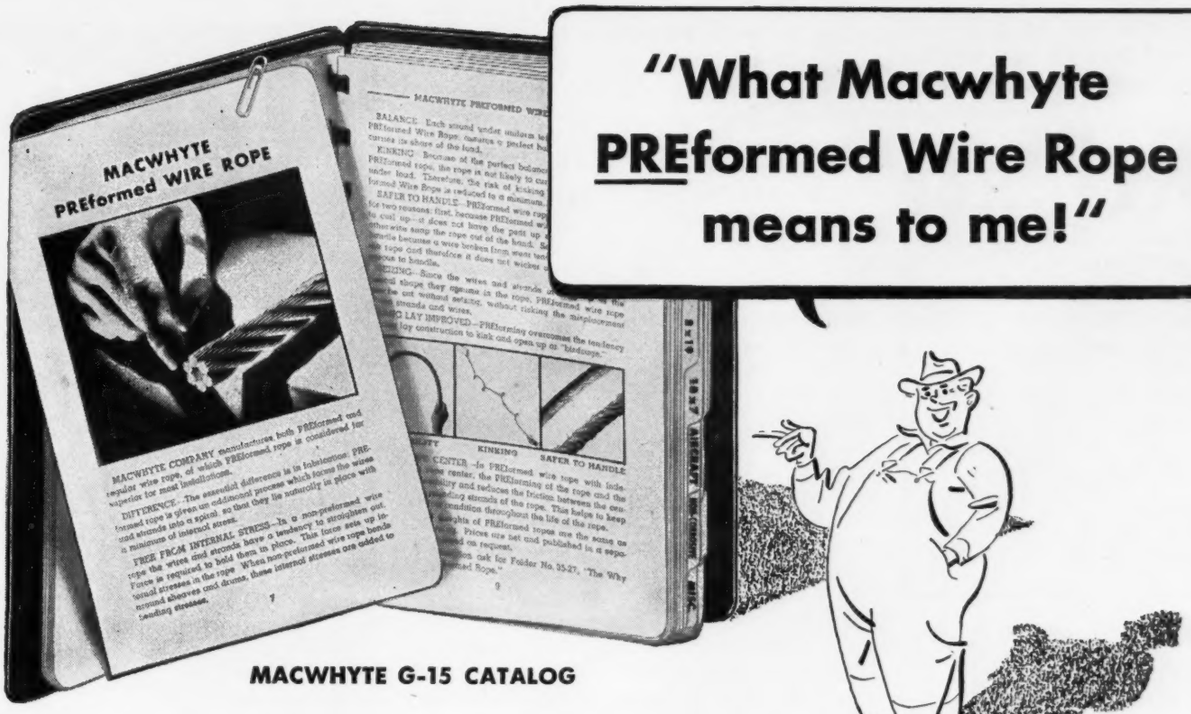
After the base has been stabilized and the large cracks and holes have been filled with a bituminous mixture, a badly cracked slab may be given a dragged seal treatment to fill the many cracks and joints at much lower cost than filling them individually. The treatment may consist of about 25 to 40 lb. of ¼-in.-down size aggregate and ¼ to ½ gal. of RC-3 or a medium-setting emulsified asphalt. By this road-mixing method of drag seal treatment, minor depressions as well as all open cracks and points are well filled. Sufficient time should be allowed for the seal to harden before placing the first resurfacing course.

Brick in old pavements which have been laid in portland-cement concrete trough construction (combined base and curb) sometimes become loose, permitting water to stand in the open joints as if the brick were laid in a pan filled with water. Anchorage or drainage, preferably both, should be provided for such loose brick before any resurfacing is placed over them. They may be anchored with a dragged bituminous surface treatment employing fine aggregate as described above for filling cracks in old concrete. No water should be standing in the joints when the treatment is applied.

In most places it is practical to pro-

(Continued on page 150)

"What Macwhyte PREformed Wire Rope means to me!"



MACWHYTE G-15 CATALOG

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All wires and strands in a Macwhyte PREformed rope are formed into a spiral, so that they lie naturally in place. Because it is free from internal stress, a Macwhyte PREformed rope has great fatigue resistance. Internal friction caused by wires and strands moving against each other is sharply reduced, resulting in a minimum of internal wear.

In Macwhyte PREformed, every strand in the rope is under uniform tension. There is no "early" wearing out of some strands while others "loaf." The perfect balance of strands makes Macwhyte PREformed exceptionally kink resistant.

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Every wire in every strand of Macwhyte PREformed rope is coated with Macwhyte internal lubricant to protect against moisture, rust and ordinary acids. Heavy and tenacious, it clings to the wires unaffected by temperature changes.

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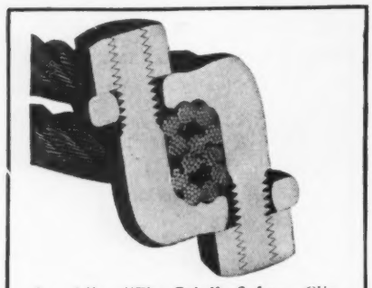
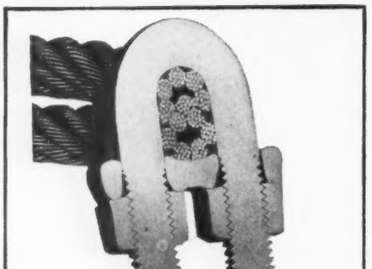


Laughlin "Fist-Grip" Safety Clip holds rope firmly by friction — with hardly any flattening.

CRUSH?



Ordinary U-bolts crush wires, frequently ruining rope ends. (Notice distorted hemp center under "U".)

(Nuts tightened to same tension with torque-indicating wrench in both cases)

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LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

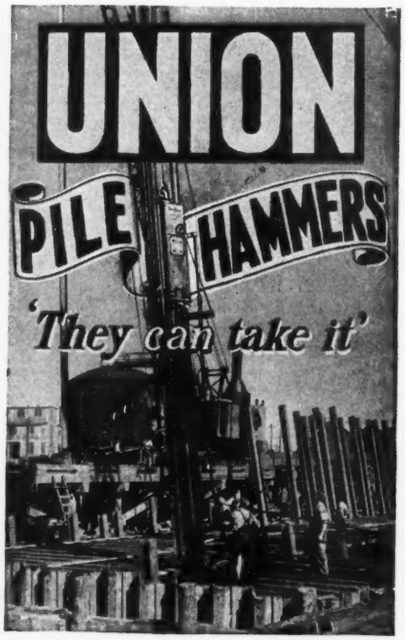
(Continued from page 148)

vide drainage by cutting away the curb at regular intervals and constructing French drains through the shoulders to the side ditches. These openings are most necessary at the bottom of two opposite grades and on long flat grades.

It is important to avoid trapping water in or under any old pavement which is to be used as a base for bituminous resurfacing. Sealed-in water may remain for years, constituting a potential hazard in freezing weather. Over such a pavement, unusually heavy hauling will probably pump water up to the bottom of the bituminous surfacing and sooner or later cause stripping of the aggregate in the lower bituminous course. The stripping may be accelerated by soil suspended in the water, aiding emulsification of the asphalt. With the lower stability resulting from the stripped aggregate, waving of the surface will develop under heavy hauling, and the pavement eventually will fail. Thicker resurfacing with bituminous concrete can retard failure and may prevent it entirely if traffic is not too heavy, but trapped water in the base is always a potential source of failure and should be removed.

Where drainage is difficult to obtain, it may be more economical to raise the

(Continued on page 152)



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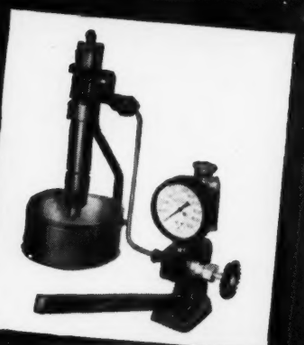

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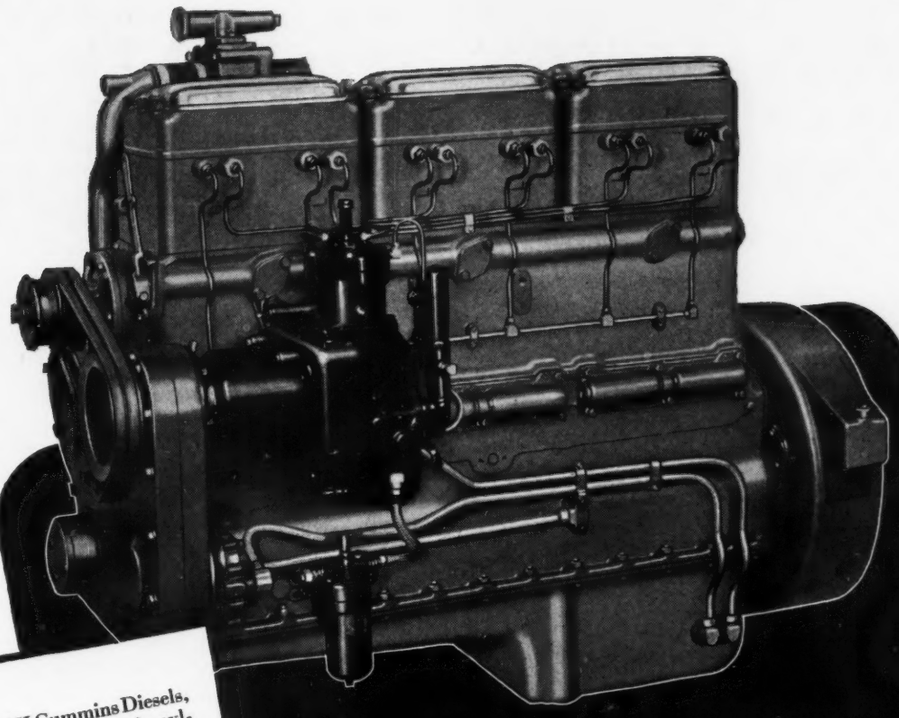

H Model H Cummins Diesels, 4⅛" x 6", four or six cylinders, develop their maximum 100 and 150 hp., respectively, at 1800 rpm. Designed for—and proved in—various types of wheel and track-mounted equipment and stationary applications.

NH Series NH-600 and NHS-600 (supercharged) Cummins Diesels, 5⅛" x 6", develop maximum 200 and 275 hp., respectively, at 2100 rpm. Both are six-cylinder, dual valve engines . . . similar in design, weight and dimensions to the Model H. Automotive and industrial models.

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Standard tests of the American Society for Testing Materials show how RAZOR-BACK "Surface peened" steel ("A") withstands continuous 2-way bending longer than fine heat-treated steel —
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Unlimited at 70,000 lbs.

"Cold-Working" Process Makes This Steel 2½ to 5 Times Tougher — Stands the Bending that Makes Ordinary Shovels Break

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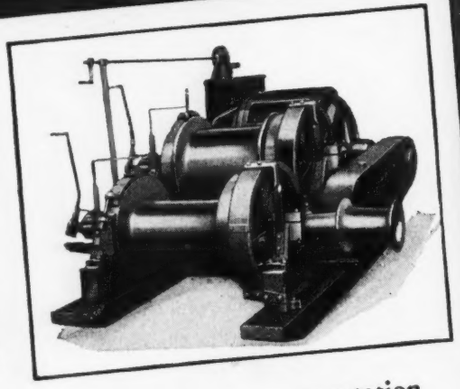

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ESTABLISHED 1873
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(Continued from page 150)

grade on badly failed sections by placing 4 to 8 in. of macadam, properly filled and compacted in layers, as a base for the bituminous resurfacing. This practice is particularly advantageous in the snow belt on roads which were originally built with grades so low as to handicap snow removal. In weighing the cost of heavy resurfacing against tearing out an old pavement and building a new one, it should be kept in mind that any pavement constructed on the existing poor soil without the necessary drainage or a thicker base will fail in the same way as the old road. Allowing for the likelihood of heavy traffic in greater volume, a new pavement may fail after a shorter service life. Traffic is the principal factor in road failures.

Fat Spots

Old patches or excess crack filler appearing rich in bitumen should be removed from the old pavement, because the excess bitumen would surely penetrate and soften the resurfacing courses. If fat spots do not show too great an excess of bitumen, they are sometimes corrected successfully by spreading aggregate of ¾- to ⅜-in. size and rolling it into the fat bituminous material. It may be necessary to cover with aggregate and roll several times before the excess bitumen is properly diluted. This method can be employed satisfactorily only in hot weather. The work should be done well ahead of time to make sure that the fat spots do not return after traffic has again used the pavement.

Long Depressions

Prior to the overall resurfacing, it is important to take out long undulations. Short-wheelbase paving machines, although thoroughly efficient in eliminating short irregularities, may not correct long undulations adequately for high-speed vehicle travel. Grade correction with a 50- to 100-ft. string stretched from one high spot to the next or, better, by an engineer's level is simple and not unduly costly. Long depressions should be filled with bituminous mixtures, well compacted by rolling. No undulations objectionable or dangerous to the highest-speed traffic likely to use the road should be left in the surface.

In reconditioning an old pavement for resurfacing with bituminous concrete, it must be kept in mind that the goal is a uniformly compacted base supporting a finished, smooth-riding surface which will stay smooth. Construction organizations which do the best work in reclaiming old roads have developed speedy methods of reconditioning existing surfaces. Unskilled crews can waste much

(Continued on page 154)

Crane today - DRAGLINE, CLAM, SHOVEL OR HOE tomorrow

To be most profitable for its owner, a mobile power shovel must have CONVERTIBILITY that matches its mobility. Quick change-over to all standard attachments is possible with MICHIGAN because it was designed all the way through for operating flexibility. No changing of drums is necessary—all connections are simple, accessible and easy to make . . . This fast-conversion feature alone saves hours and hours of time every month when the machine must serve a variety of purposes. . . Every MICHIGAN is AIR CONTROLLED—for continuous work all day at top speed and with operator-ease. . . . This is Model T-6-K—the 3/8-yard Shovel, 6-ton Crane unit which, along with the larger 10-12-ton models, is making materials-handling history in civilian as well as military use today.

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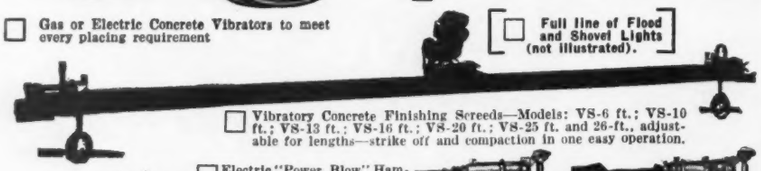

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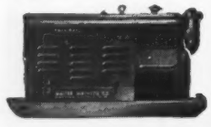

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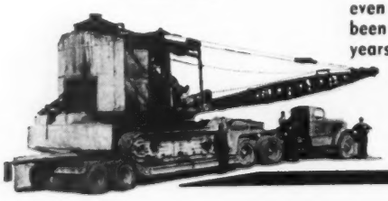


ROGERS BROS. CORP.
ALBION, PENNA.

(Continued from page 152)

time and money in doing this work; some attempt to overdo it. It is not necessary to expend a great deal of time patching small depressions. The bituminous paving machine will eliminate these slight depressions, if not in one course, then in two, when it is spreading the overall courses.

Leveling Rough Surfaces

On an extremely rough old surface of either rigid or non-rigid type, a thin road mix, often called a dragged surface treatment, sometimes is applied and allowed to remain under traffic for several weeks before the plant-mix resurfacing is placed. This road mix, previously described under Seal Coat on Cracked Pavement, may be used to serve the dual purpose of sealing cracks and leveling the surface.

On an old surface of the bituminous type, provided it is not too dry, no prime may be necessary before applying the drag surface treatment. Old brick or portland-cement concrete or dry bituminous surface should be primed with 0.05 to 0.1 gal. of RC cutback or a quick-setting emulsified asphalt.

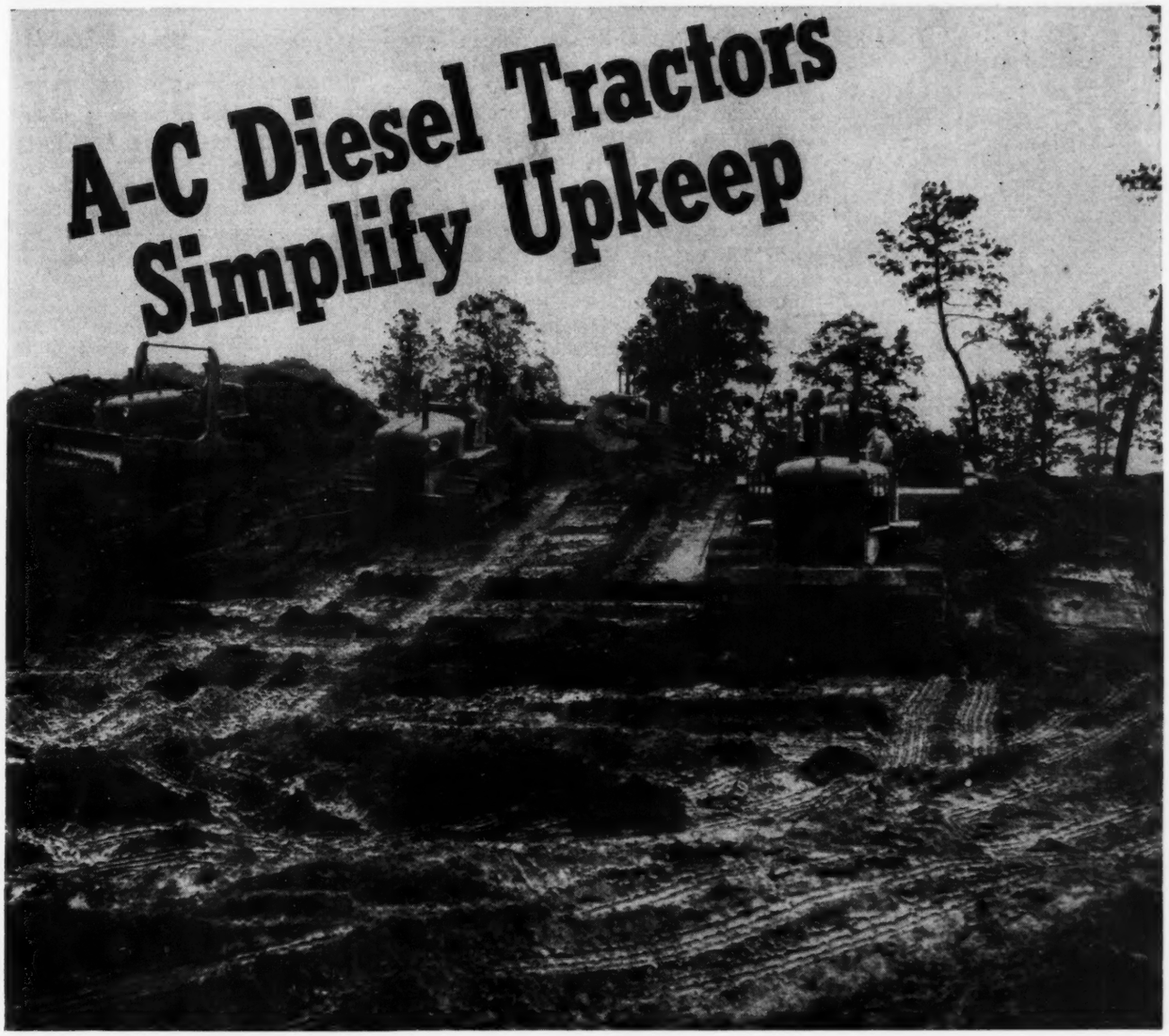
For a preliminary leveling course, a plant mix of the cold or workable type may be spread over the surface from a truck and leveled with a motor grader. Skilled crews do excellent work with this crude method. Where undulations are not too long, another method is to spread the plant mix on the old rough pavement with a paving machine in what is sometimes known as a "scratch" course. In a "scratch" course, the machine scratches the high places; that is, it is so set as to fill the depressions with bituminous concrete and leave practically no material on the high places. This method has proved very satisfactory. In all leveling or "scratch" courses a fairly dense mix should be used to reduce to a minimum voids which might be the source of water pockets. A dense mix is particularly necessary where poor drainage conditions prevail.

Widening Old Pavement

Where existing pavement must be widened to accommodate increased traffic demands, it is important that the widening strip be properly excavated, drained, filled, compacted and bonded to the old pavement to provide uniform support for the overall resurfacing courses and assure a future roadway surface free from failure and excessive maintenance.

Excavation for Base Widening—A narrow trench to accommodate the widening ordinarily is excavated by a machine rid-

(Continued on page 156)



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• *2-Cycle* . . . THE MODERN DIESEL POWER

(Continued from page 154)

ing on the old pavement, which serves as a guide for both grade and alignment. Graders equipped with special scarifiers and short blades designed to cut the required width of trench commonly are used for this work.

Trenching machines which travel on the old pavement and excavate the trench to proper grade and alignment in one pass are coming into more general use for the purpose. To speed operation of the trencher, the shoulder sometimes is loosened by scarifying in advance. If the old pavement is extremely rough, a leveling course is placed first to provide a more even track for the machine, facilitating excavation to fairly uniform depth.

Drainage Through Shoulder—On poorly drained soils and in side hills where water seeps out of horizontal strata, it is advisable to construct French drains under the widened base through the shoulder to side ditches or other outlets. The bottom of two upgrades is a most important location for such a drain. French drains should be wide enough and deep enough and should have sufficient slope to prevent their readily becoming clogged. Installation of such drainage outlets through the shoulders will prevent sealing of water in porous base materials by plastic clay shoulders and subsoil, a condition which has accelerated the failure of many roads.

Materials for Widened Base—Gravel, crushed stone or slag may be used for base courses in the widened portion of the pavement, with the courses well compacted. If uncrushed gravel is used, it is desirable to place a layer of crushed aggregate, bonded with screenings, on the top, just under the bituminous surface. As in building a good foundation under all new pavement, it is imperative that the courses of uncoated aggregate be well compacted and filled with fines. The upper course, at least, of the widened base should consist of a bituminous concrete or bituminous-coated aggregate.

Because of the difficulty of obtaining good compaction promptly with uncoated aggregate, many highway and street departments construct the entire base widening, with the exception of the insulation course, of asphaltic concrete as shown in Figs. 2, 3 and 4 of the accompanying drawing. Improper compaction may cause a crack in the bituminous resurfacing over the junction of the widened base with the old pavement. A 1¼- to 2-in. insulation course of limestone or slag screenings is placed on clay soils before the bituminous concrete is spread.

Experience indicates that the practice

(Continued on page 158)

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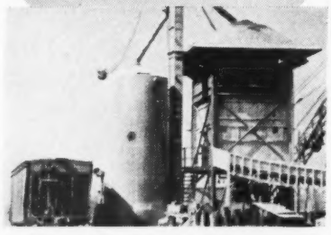

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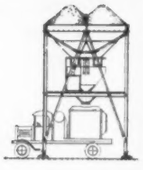
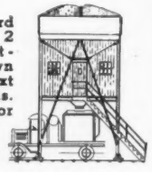


Basic 30 yard bin with 2 compartments shown at left. Next step—60 yds. with 2, 3, or 4 compartments on the right. FLEXIBILITY? YES! Partitions change conveniently for the number of aggregates required. Centrally located cement compartment added any time.



STEP 2

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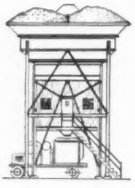
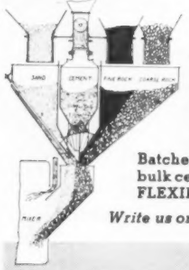


STEP 3



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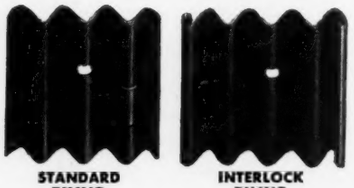

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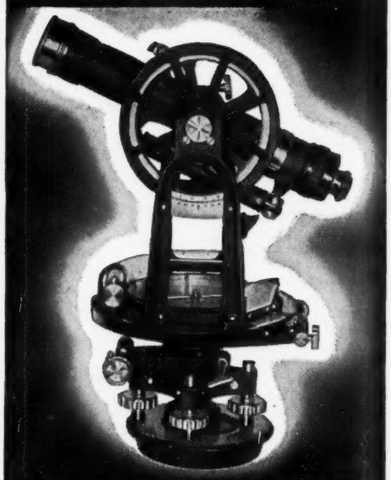

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(Continued from page 156)

of constructing widened base with bituminous concrete is well justified. The increase in tonnage of plant mix sometimes produces a slight reduction in the unit price of the resurfacing courses. Use of a bituminous concrete, particularly a hot mix, speeds up the work by reducing or eliminating delays in waiting for previously laid courses to cure or dry out, often a vital factor in the contractor's progress.

Forms vs. No Forms

Steel forms are sometimes used at the outside edges of pavement widening. They are set in the same manner as for portland-cement concrete pavement, usually with the top of the form level with the surface of the finished overall resurfacing course, if the job calls for such a top course. Thus the form serves as a guide both for building the base courses on the widened portion and for spreading and striking off the resurfacing courses. If a track-riding finishing ma-

(Continued on page 160)

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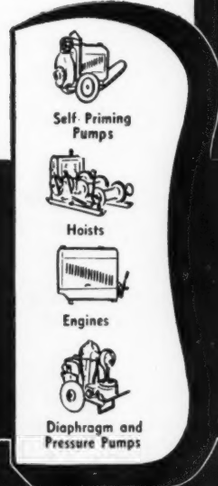

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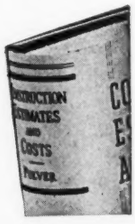

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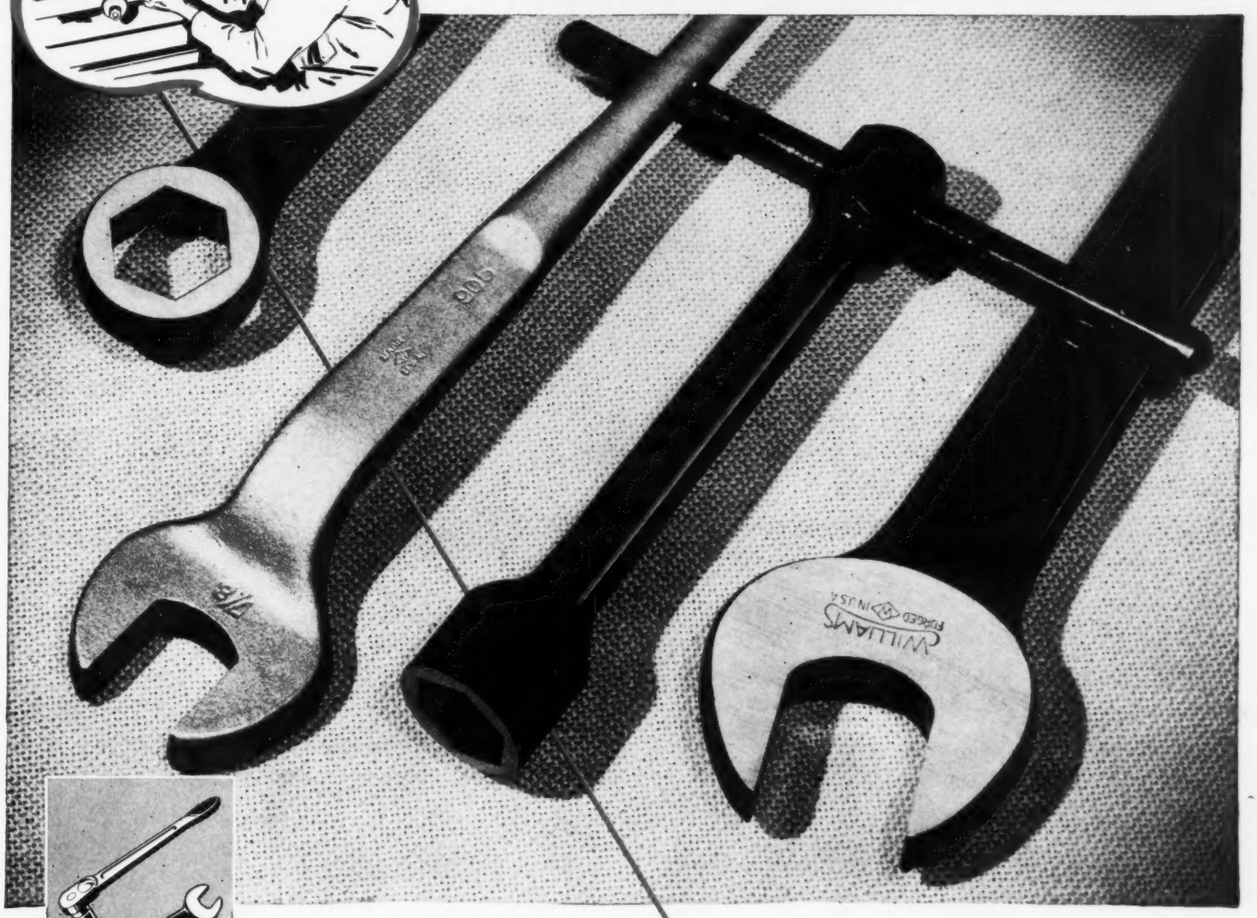

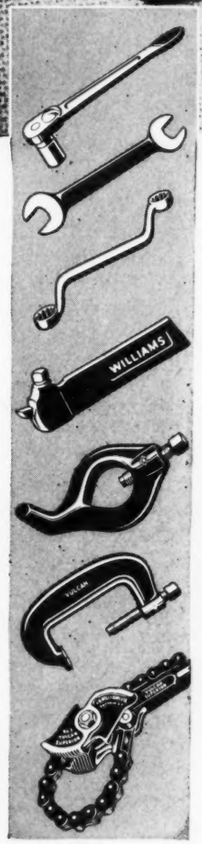

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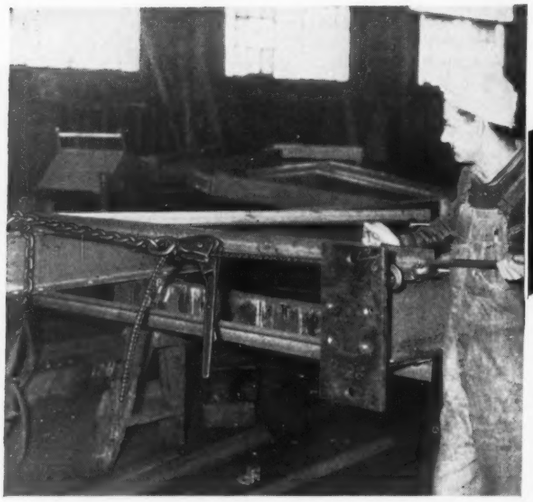

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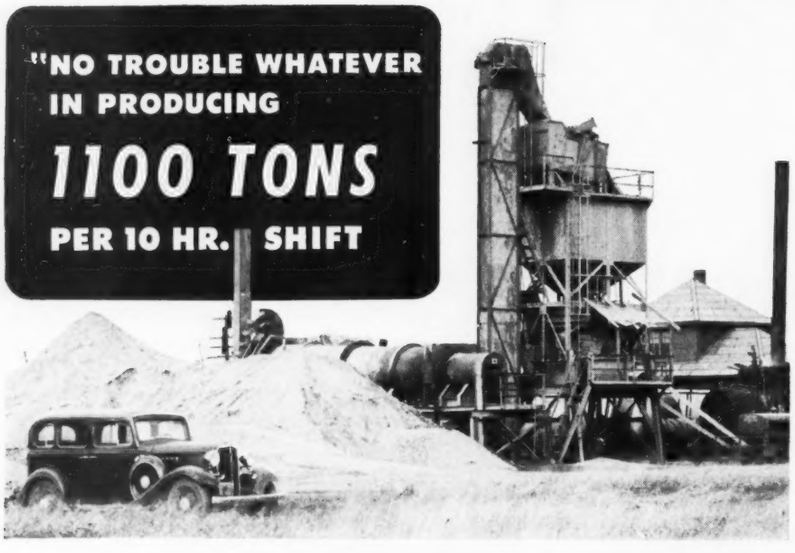

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(*Continued from page* 158)

chine is used, it operates on this steel form.

Since manufacturers have perfected bituminous paving machines (Adnun, Barber-Greene and Jaeger) which travel by wheels or track on the old pavement or on the new course after it is laid, the best up-to-date practice omits forms in favor of the more economical method. With a paving machine, a trained crew will lay without forms as smooth-riding a surface as that laid by a finishing machine traveling on steel forms. Where forms are omitted, offsets generally are provided, with each base course a few inches wider than the course above. No advantage is gained in making these offsets wider than required for an edge slope of 45 deg.

Where no side form is used, the trench usually is cut in such a way that the earth serves to prevent lateral movement of the bottom courses, whether of untreated aggregate or bituminous mixture. Hot-mix-courses as thick as 3 in. are built satisfactorily without the use of forms. To hold lateral displacement within reasonable limits in the hottest weather, when side forms are not used, it may be desirable to delay slightly the rolling of a hot-mix bituminous concrete course until some stability has developed in the mix.

Spreading and Compacting

To spread successive courses of either coated or uncoated aggregate in a trench for widened base, spreader boxes riding on the old pavement (and on steel forms, if present) are used. Where the steel form is omitted, the spreader box is so designed as to ride only on the old pavement. Commercial spreaders of this type with a screw feed are now being developed.

Rolling of a narrow strip of base widening, both on the subgrade and on successive base courses, is accomplished by means of a trench roller which has two narrow roller wheels, varying from 12 to 20 in. in width, and a third or pilot wheel which rides on the old pavement. The pilot wheel can be varied in elevation to accommodate the changing depth of trench in rolling successive courses. It is extremely important that the top of the base widening be finished about ¼ in. above the level of the adjacent old pavement. This slight excess of elevation permits rolling to maximum density, which gives assurance against future settlement and the opening of a crack in the bituminous resurfacing course above the junction of the old and new base.

Edge Paint Coat—Before asphaltic concrete is placed in base widening, the vertical edge of the old pavement should be

(*Continued on page* 162)

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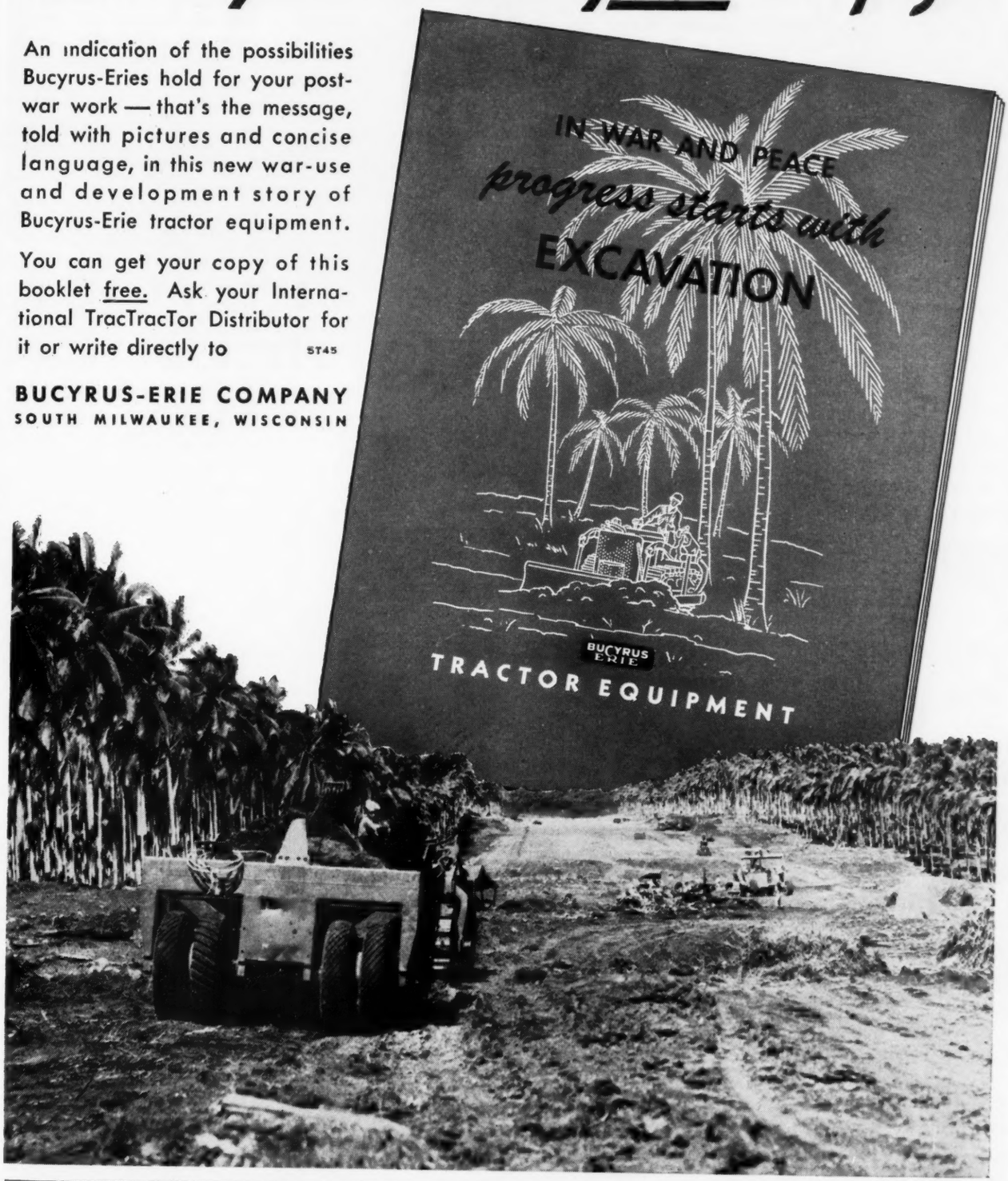

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(Continued from page 160)

cleaned and coated with an application of emulsified asphalt of RS-1 rapid-setting type. The material may be applied with a hand brush or with a spray. This process of sealing, or bonding, the new widening to the old pavement helps prevent later formation of a crack in the resurfacing over the joint.

Part II of this article, describing the resurfacing of existing pavement, will appear in next month's issue of CONSTRUCTION METHODS.

★ ★ ★

STEP-BY-STEP FIELD METHODS

(Continued from page 77)

line-powered ½-yd. mixer and delivered in two-wheel concrete buggies to the movable bridge. The mixer was set up in convenient locations on the operating floor slabs over the four pipe galleries to fit concrete-placing requirements.

Concrete for the job was a 1:6 mix made with sand, as the fine aggregate, and a coarse aggregate within the limits of ¼ to ¾ in. Universal Atlas cement and aggregates from the Material Service Corp. were used. Minimum compressive strength was specified at 3,750 psi. at 28 days. Test samples of each pour were taken at random and made into 6x12-in. cylinders which later were tested on an Elmes 6-in. hydraulic ram by City of Chicago engineers.

In preparation for the first concreting operation, the effluent pipe tees were located and fastened in position upright on plywood forms by ½-in. double-end bolts which passed upward through the form and wood blocking traversing the tops of the tees. Chutes conveyed dumped concrete from five apertures in the overhead bridge to the effluent duct forms, where the concrete was puddled, spaded and vibrated with a Mall internal vibrator. The slab concrete was smooth-finished flush with the floor of the basin.

Trough Construction

With complete sets of side forms available for a total of 18 troughs in two filter basins, the contractor was able to strip and leapfrog one set of forms ahead to the next location while concrete was being placed in the second set of forms in the intervening basin. Wood frames,

(Continued on page 164)

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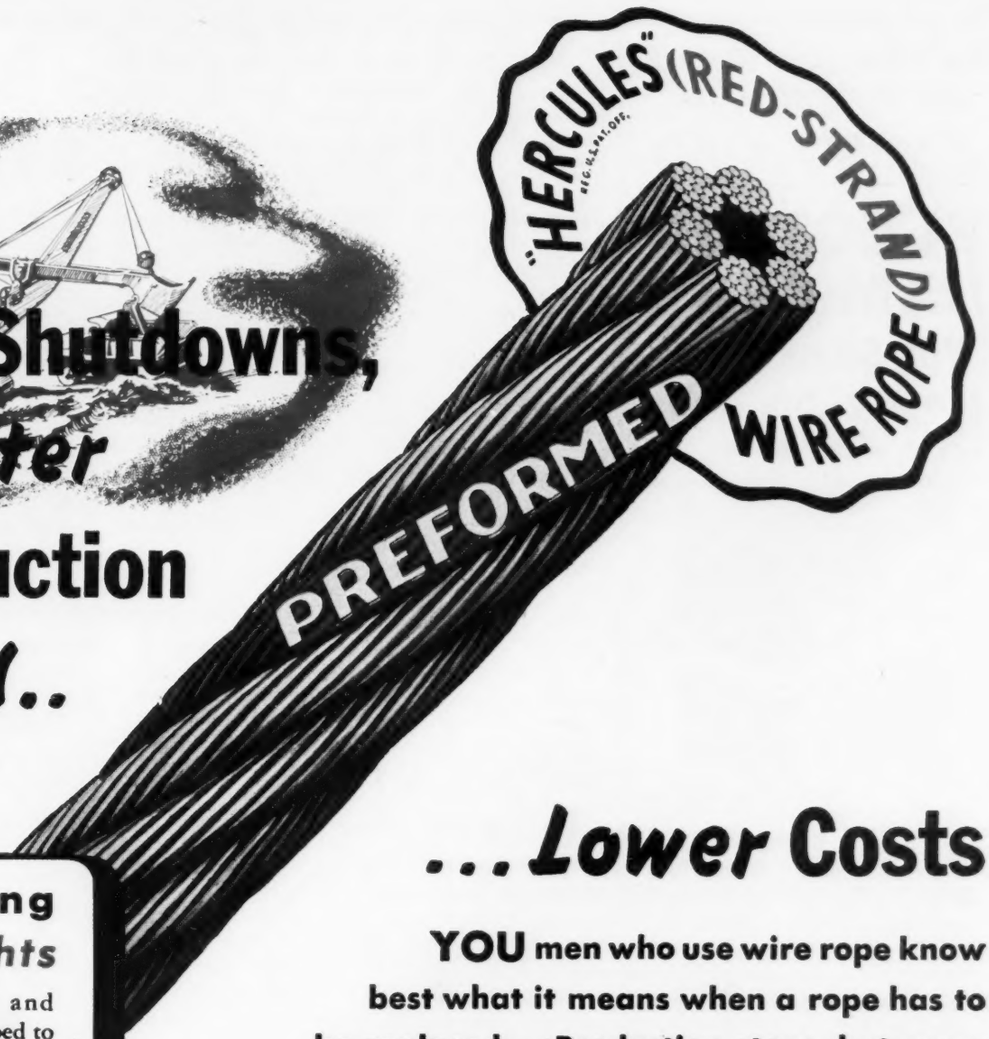

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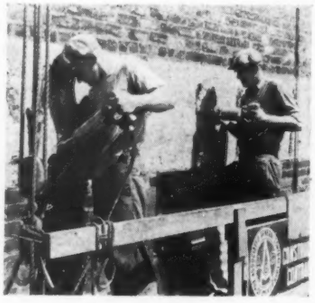
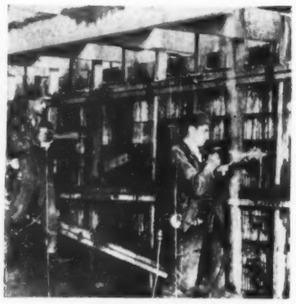


Cutting and Chipping



Vibrating Concrete Forms

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(Continued from page 162)

equipped with adjustable screw jacks to support the steel bottom forms for the troughs at the proper grade, were erected at least three basins ahead of trough concreting. A large Yale spur-geared chain block, traveling on the overhead I-beam monorail, handled the moving and placement of equipment and steel forms.

Before being swung ahead to a new location, used steel forms were deposited on the floor slabs over the pipe galleries for cleaning and scraping by hand. After the supports for the troughs had been set in place in the basin, the monorail hoist lowered clean steel bottom forms into place for the nine troughs. Both bottom forms and side forms were coated with a paraffin-base oil before concrete was placed.

On the steel bottom forms for each trough, the trolley chain hoist lowered a cage of prefabricated steel reinforcement. A side-form unit, complete with spacers, then was conveyed into position by the same means, lowered over the reinforcing steel and bolted to the bottom forms in proper grade and alignment. All nine troughs in the basin were made ready in this way for concreting.

Placing Trough Concrete

Concrete placement started with the movable bridge centered above the first trough in the basin. Concrete dumping by the carts was begun at the aperture nearest one end of the bridge and proceeded to the other chutes as the forms were filled. Workmen at the lower end of the chutes placed the concrete alternately in the side forms of the trough and spaded it down until the bottom form was packed. A wooden maul was used to pack the concrete more thoroughly in the forms along the bottom, and the side forms were filled in like manner, in gradual lifts along the length of the trough. The final step involved hand forming and finishing of the rounded external edge of the weir on either side of the trough with rough and smooth trowels.

While cement finishers were working on the weirs of the first trough, the movable bridge was rolled along to the second trough, and the operation was here repeated, as it was for each of the remaining troughs in the basin. All nine troughs then were entirely covered with light tarpaulins, which were wetted down for protection of the concrete while it was curing.

Placing concrete in the nine troughs of a basin occupied most of an 8-hr. shift. While concreting was in progress in one basin, steel forms and reinforcement were being made ready in the next adjoining basin for the following day's work. Upon completion of concrete placement by the

(Continued on page 166)

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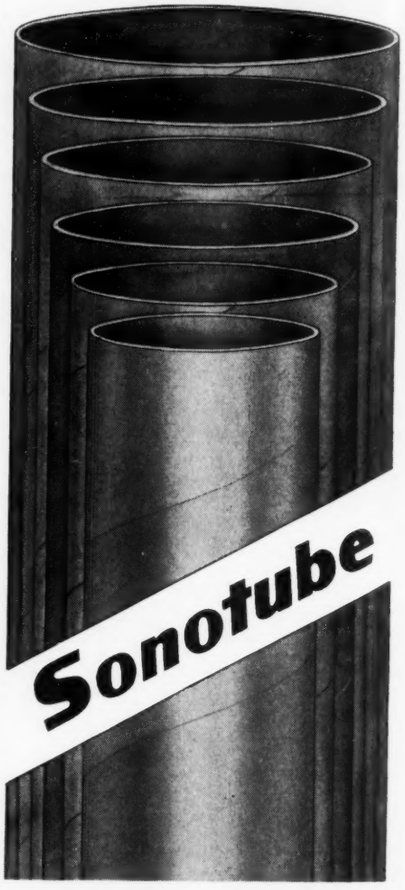

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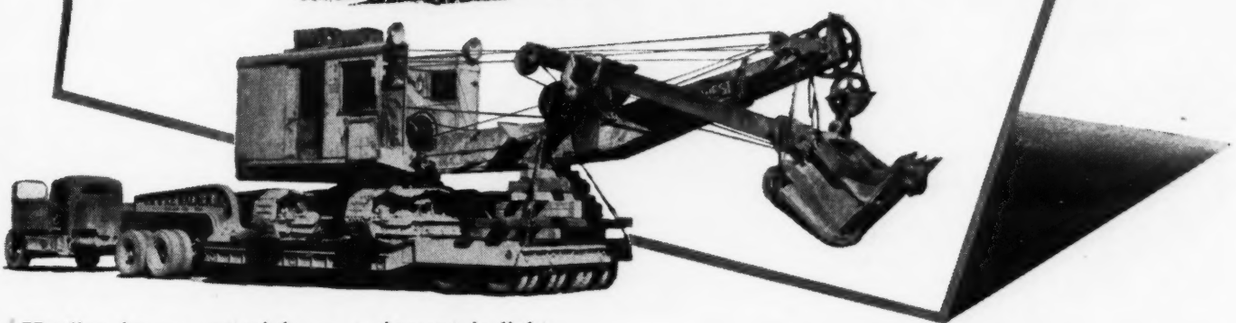

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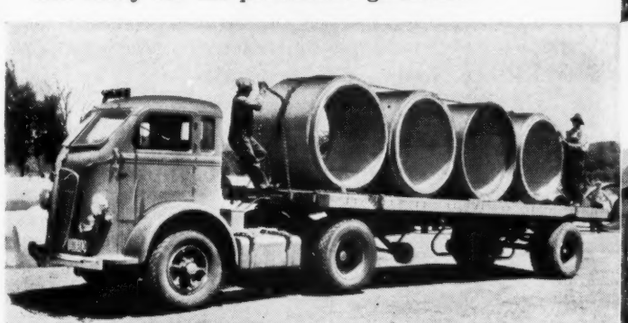

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(Continued from page 164)

shift, the mixer and bridge were moved ahead to the other basin in preparation for the next day.

After the minimum time required for hardening of concrete, the trough side forms were unbolted from the bottom forms, and the entire side form unit, consisting of two complete sets of side panels attached by spacer bars and turnbuckles, was lifted from the basin and carried by the monorail to the next pipe gallery slab for hand scraping and cleaning. Bottom forms could be removed after a minimum of 120 hr. Short divider plates, set on the adjustable falsework bents, remained in place while the main bottom forms were being removed, cleaned and placed in another basin between fresh sets of supporting plates.

Leapfrog Procedure

Construction in each filter basin was part of a multiple leapfrogging movement which progressed along each bank of eight filter basins until the entire row of basins had been completed. Upon reaching the final basin of a row, operations were transferred to the adjacent bank, and the direction of movement was reversed, with construction doubling back along the second row of filter basins.

At the end of the first bank, the monorail was removed and re-erected over the adjacent basin in the second row, whence it was extended progressively in a direction opposite to that taken along the first bank. This transfer of equipment was carried out in a uniform manner at the end of each bank, with the result that the path of construction followed a continuous line through the ten rows of filter basins.

Effluent Piping

Following the concreting crew, a crew of steamfitters lowered and set sections of 4-in. lateral effluent piping into the tees previously concreted into the effluent duct slab. As all concreting operations already had been completed, the steamfitters were able to work without interference. Tees and lateral piping were supplied by the J. B. Clow Co.

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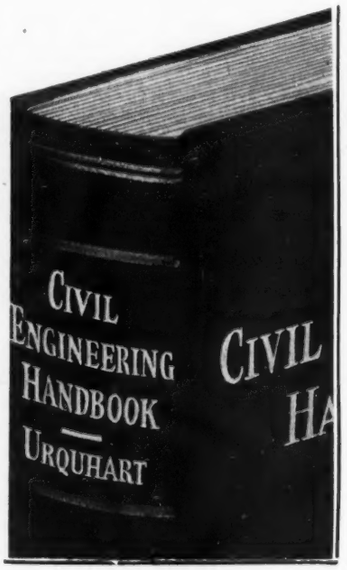

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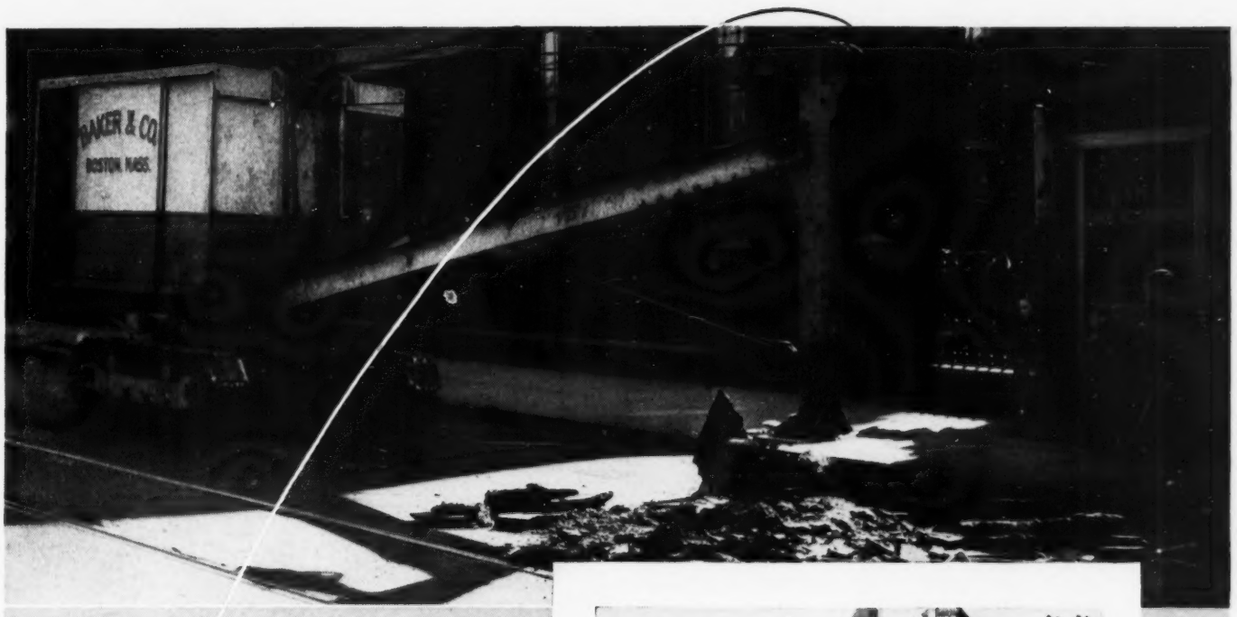

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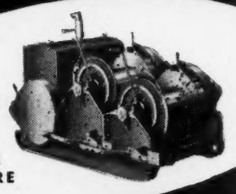
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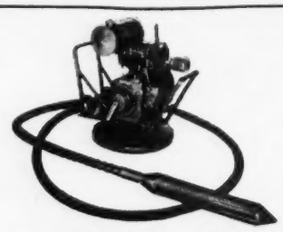
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